THE ATHENÆUM

Journal of English and Foreign Literature, Science, and the Fine Arts.

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August, 1843. J. LONSDALE, Principal.

KING'S COLLEGE, London.—MEDICAL DEPARTMENT.—The several COURSES of LECTURES in this College will COMMENCE for the Winter Session on Monday, the 2nd October.
King's College Hospital.—The Hospital is attended daily at 1 o'clock by the Physicians and Surgeons throughout the year, and Clinical Lectures are given every week during the Winter and Summer Sessions.
Residence of Students.—A limited number of Students may be accommodated with rooms in the College, and some of the Professors receive Students into their houses.
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2nd September, 1843.

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373,738 oz. Silver delivered at their works agreeably to contracts entered into, the proceeds	418,037	14 6
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8,000 cwt. remained for sale or further shipment. The cost of the Buildings at Alicante.....	33,439	9 0
The cost of Machinery from England, and erecting seven furnaces.....	29,696	16 15
The cost of a Smelting Establishment at Garrucha, with five furnaces complete, which now yields from 40,000 to 45,000 ounces of silver monthly, besides lead, at a comparatively small expense, owing to its proximity to the mining district.....	45,000	0 0
	107,127	5 15
Profits on an average of nine months' work, with actual force at both works, on a capital of only 50,000 dlrs.	54,904	7 16
Deduct extraordinary expenses, which will not occur again, incurred in bringing from England an experienced assayer, and the necessary workmen of every description, including their salaries until the works were ready.....D. 10,000	0 0	
and interest on monies taken on loan 14,204	19 30	
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REVIEWS

On Feigned and Factitious Diseases, &c. By H. Gavin, M.D. Churchill.

THIS volume opens a curious and interesting chapter in the history of human nature—a chapter studied but by a few, and scarcely even apprehended by the mass of observers. That man should (in the language of Falstaff) "turn diseases to commodity," is certainly no anomaly in his general habits; and there are cases in which the recurrence to sham pleas of sickness, for specific purposes, is an admitted fact. But the extent to which the practice is carried, the almost infinite variety of diseases simulated, the exhaustless ingenuity exerted, both in the commission of fraud, and in attempts to detect and defeat it, are but obscurely guessed at in the philosophy of any, save those who are specially interested in the consideration. From the truant schoolboy to the veteran intriguing for a retirement and a pension, manifold are the practices upon the ignorance or the credulity of the profession; and as if such sinister motives were not enough to urge on the cheat, occasions are of frequent occurrence, in which a species of monomania impels its victims to the practice of this deception, or in which a simply perverse cunning finds its account in successful imposition, unmotived by any ulterior purpose.

It is, however, in the army and navy that the principal inducements are offered to practice deception; it is there, especially, that a war of ingenuity is engaged between the simulator and the medical officer; and the arts of deception have been carried to such perfection, that Foderé thought it as difficult to detect a feigned, as to cure a real, disease. The counterpart of such deceptions, the dissimulating real diseases, either for the purpose of receiving enlisting money, or, in civil life, for defrauding insurance offices, is less dwelt upon by the author; but the amount of fraud thus attempted or committed is by no means small.

For the purposes of deception, the symptoms of disease may be altogether feigned, or a real disease may be factitiously excited; or, again, a natural infirmity may be exaggerated, either by false representations, or by the employment of drugs. There is also another case in which fraud is largely mixed with reality—we allude to that of enthusiasts of various denominations, who begin by yielding to the influence of the imagination, or who fall into morbid conditions by the activity of the imitative instinct, and who, when well warmed to the business, supply by combination and contrivance whatever may be wanting, in these causes, to complete the colouring of the tale. This mixture of the true and the false is, indeed, sometimes dependent upon a still more extraordinary principle of our nature; for it is found, that hysterical women and hypochondriacs, who really believe themselves the victims of the most extraordinary and impossible diseases, when baffled in their statements of imputed fact by the intelligence of their medical adviser, are prone to attempt making good their story by artful imposition. This affords an additional difficulty in the discharge of professional duties; for the discovery of a determinate fraud does not exhaust the inquiry, by yielding a certainty that there is nothing real in the case. So also the means adopted for exciting fictitious disease may end in establishing a real malady, or the bare mimicry of certain symptoms may lead to their establishment as a positive disease. Thus the efforts made to excite a temporary irregularity in the action of the heart, may occasion positive disorganization of that part; and the frequent enactment of a fictitious fit of epilepsy, is a not unfrequent means of establishing the actual disease. This complexity of the subject besets the practice of the medical officer with many snares; for not only is he called on to guard against imposition, but to defend his patient from false imputations, and most especially to protect the sick against his own passions, irritated by the suspicion of imposition. The encounter of wits, thus established, between the impostor and the officer to whose care he is committed, is of the most exciting description; and the *amour propre* of both are deeply compromised by the issue. Obstinacy on one part begets a corresponding obstinacy on the other; and it is often a mere question of who shall hold out longest. It must be borne in mind, also, that as certainty must bring the contest to an abrupt conclusion, the bare fact of its being carried on entitles the patient to all the benefit to be derived from doubt. It will not do to presuppose guilt, and to attempt a clearing up of the mystery by means, which would be tyrannous to the innocent, though no more than just punishment to the offender. On this point Dr. Gavin makes a grave and important distinction—that punishment is no part of medical duty: that when certainty of guilt is once obtained, the facts belong to the cognizance of a court-martial. It follows, therefore, most cogently, that the surgeon is not justified in the application of cruel tests, amounting to punishment, in the apprehension that they may tend to conviction. Again, as we have stated, fraud itself does not necessarily imply guilt:—

"Perversion of reason, rather than the attainment of a discharge, or the evasion of duty, would sometimes appear to give rise to the simulation of diseases. In corroboration of this statement, Dr. Cheyne says, that he has no doubt that soldiers are often actuated by the same wayward fancies, so perplexing to the physician, which influence hypochondriacal or hysterical patients in the middling or upper ranks of life. Dr. Hennen states, that some of the diseases of soldiers derive their character from a certain state of mental hallucination. Some soldiers, indeed, without any ulterior object, seem to experience an unaccountable gratification in deceiving their officers, comrades, and surgeon: and Marshall remarks, that the simulation of disease, in some instances, seems rather to be a consequence of insanity, than a rational attempt of a man to improve his future prospects. He instances a man who divided the tendo-Achillis with a razor, and prevented as much as he possibly could its reunion, who bore an excellent character, had served twenty-six years, and might have been discharged with a good pension when he pleased. It is stated in the 'Cyclopædia of Practical Medicine,' that there are cases which indubitably show, that the simulation of disease has frequently been practised without the existence of any interested motive, indeed without motive of any kind; that there is, in short, a species of moral insanity of which this simulation is the characteristic."

The surgeon, therefore, is at most justified in such attempts only at extorting confessions of fraud, as consist in the employment of those severe remedies which are adapted to the cure of the disease, if it should be real; and in the application even of such tests, there is this additional evil, that it may be difficult to determine how far the resulting convalescence is the effect of a dislike to the remedy, or depends on a really curative operation. These considerations are sufficient to exhibit the perplexing nature of the inquiry, and to show the narrow path to be trod between carelessness or a false humanity on the one side, and on the other, a culpable desire to detect fraud at all risks—an overweening conceit, and a wish to be thought adroit and clever at the expense of others.

The motive for simulation being given, it is clear that every disease may be assumed; but there are certain bounds, affixed by circumstances, to the field of imposture, which materially narrow the inquiry. Thus, if the object be to obtain a prompt relief from an impending duty or punishment, the disease assumed must necessarily be an acute malady; if the end be a discharge from the service, a chronic disease is most easily assumed for the requisite time, and is less easily detected, than one of which the features change from hour to hour. Again, the probable ground for deception will be a malady with which the patient is best acquainted. The military student of the art finds his readiest lessons in the infirmary; and as he cannot affect with success a disease, when he is ignorant of all its symptoms and accidents, he will most likely choose some one that he has witnessed in that hospital. Then, again, the skulker will prefer such diseases as exhibit the fewest symptoms cognizable by the senses, and for the knowledge of which the examiner is most exclusively dependent on the veracity of the narrator. On this account deaf-dumbness is a favourite cheat with mendicants, and with those whose previous history cannot easily be traced. Dr. Gavin, among other instances, quotes an impostor,—

"Whose remarkable ingenuity resisted for four years an infinity of investigations by the most scientific men in France, Germany, Switzerland, Spain, and Italy, but whom the Abbé Sicard afterwards detected by his writing as he heard, not as he saw. This case, however, would not have been detected, had he not foolishly stated himself to be an élève of the Abbé Sicard. He was put to the most trying proofs, he was tempted by a young and beautiful woman, who offered him her hand, but without effect. In the prison at Rochelle, the turnkey was ordered to sleep with him, to watch, and never to quit him. He was repeatedly violently awakened, but his fright was expressed by a plaintive noise, and in his dreams guttural sounds alone were heard. The hundred prisoners who were all ordered to detect him if possible, could discover nothing from which they could imagine deceit. The following extracts will serve as a specimen of his writing, and afford an illustration of the ingenious manner in which he was detected:—'*Je jur de vandieux; ma mer et né en nautriche; quhonduit* (pour *conduit*); *essepoise* (pour *espoir*); *torre* (pour *tort*); *ru S. Honoret; jai tas present* (pour *j'étais présent*); *jean porte en core les marque* (pour *j'en porte encore les marques*).' It will be observed that in this letter Victor uses *q* instead of *c*; and from this Sicard inferred, that he had heard and knew that the sound of these gutturals was similar."

The performance of the deaf and dumb part is, however, more difficult than is usually supposed, requiring an incessant vigilance to preserve the necessary self-control:—

"The impostor frequently forgets himself during sleep, when any one calls him by name. He endeavours to escape from danger when there is a great noise. The dumb man, when he is attacked at night, as if by a murderer, forgets his part in defending himself, and cries out; whereas he ought merely to give a kind of screech. Extreme pain often entices from him articulate tones,—though Cheyne mentions the case of a man pretending this complaint, who was shot in the ear by an awkward recruit, yet did not forget himself, and only expressed pain and consternation by a variety of motions and contortions. This man exhibited this disability for no less a period than five years, and only recovered his speech when he was discharged from the service. Very frequently the deaf hear, and the dumb speak, when an operation threatens them. This, however, was not the case with a seaman on board the *Utile* frigate, who pretended to be deaf and dumb. The surgeon, appearing to be deceived by him, made very formal and ostentatious preparations for an operation upon his throat, and while his attention was thereby engaged, he applied a lighted candle to the man's fingers. He resisted this test, however, and represented his case to the Admiralty, who caused the surgeon to be dismissed his ship for cruel, or at least unprofessional treatment of his patient. The person, afterwards finding that the deceit was productive of no advantage,

gave in. This man was of a very different temper from the simpleton of whom Parr speaks,—'How long have you been dumb, my good friend?' says a passenger, with the most insidious humanity. 'Three weeks, sir!' replied the incautious deceiver. Foderé says, that a good way to detect pretended deaf-dumbness, is to say something deeply interesting to the patient in his presence, and mark the effect it produces on his countenance. Sir Walter Scott illustrates this admirably in 'Peveril of the Peak,' where Fenella betrays herself on hearing that Julian is assassinated."

Among the many diseases which may be feigned for fraudulent purposes, madness has recently been brought into peculiar notice, through an epidemic apprehension, that the facility of deception will tempt to the perpetrating great crimes against society. On this point Dr. Gavin affords some curious information. A false plea of madness as a means of extorting charity, by working on the fear, as well as the charity, of individuals, is as old as the history of mendicity; but the rareness with which it has been pleaded to avoid punishment, shows that it is not a very effectual means of escape. Indeed, it is hardly to be believed, that any one urged by passion to commit a great crime, would take time to establish the requisite fictitious antecedents for laying a ground-work for the plea. Dr. Gavin justly thinks, that the disease itself is difficult to feign, so as to deceive the expert. It is curious, he says,—

"To observe, that among the numerous delineations of insanity, presented in the writings of poets and novelists, there is scarcely one in which there could not be pointed out the most glaring deviations from nature, so much so as to strike any one competently informed and versed in the history of the disease. Shakspeare, Goethe, and perhaps a few others, might stand the application of the severest test; but nearly all others have completely failed in their delineations. * * Dr. Cheyne says it is extremely difficult to feign insanity, so as to deceive those who are familiar with the phenomena of mental disease. Yet he states that we are in more danger of supposing insanity simulated when it is real, than of supposing that disease to be real which is only pretended."

On the whole, the difficulties which at present surround this question, in practice, seem to arise "less from the obscurity of the subject, than from the imperfect means which have been applied to its elucidation."

But if furious lunacy be difficult to feign, monomania is still more so, as almost every writer on the subject asserts. It is a form little known to the general public; and nothing but a long and minute observation of the quiet, half-rational insanity of the monomaniac can qualify an impostor for his task:—

"The simulator is deficient in the presiding principle, the ruling delusion, the unfounded aversions, and causeless attachments, which characterize insanity. He is unable to mimic the solemn dignity of characteristic madness, nor recurs to those associations which mark this disease; and he wants the peculiarity of look which so strongly impresses an experienced observer. His feelings are not so concentrated as to be almost inaccessible to impressions unconnected with the subject of his melancholy. No moral abyss separates him from all objects and sentiments that present no relation to his fears or delusions. No periodicity or exacerbation characterizes his disease. It is most difficult for him to sustain his part, and to cause no false vibration of the cord upon which his exclusive idea is accounted to depend. The mental and physical peculiarities of partial mania are of a kind that do not obtrude themselves on the observation; and instead of loudly proclaiming his crazed condition, and soliciting the attention of the beholder, some investigation is required in order to discover them. This, however, is contrary to the purposes of the simulator; which require an immediate and powerful impression to be produced on the minds of his supervisors. The real monomaniac never troubles himself to make the subject of his delusion accord with other notions having relation to it, and the spectator wonders that he fails to observe the inconsistency of his ideas, and, that when pointed out to him, he should seem indifferent to, or unaware of this fact. In the simulator the physician will discover an unceasing endeavour to soften down the palpable absurdity of his delusions, or reconcile them with correct and rational notions. This marked anxiety to produce an impression, is widely different from the reserve and indifference of the real disorder, and will of itself furnish almost conclusive proof of simulation. Marc states, that a real monomaniac is strongly prejudiced in favour of his opinions; that the slightest contradiction excites his temper; while the simulator readily overlooks this essential point in his part, if the contradiction be skilfully managed."

Of moral insanity (which, in our estimate is improperly separated from monomania with illusions, as differing only in degree,) we have a graphic detail, for which we must make room, as the subject is as yet so imperfectly before the public:—

"The term Moral Insanity has been adopted, because physicians have not been able to detect any delusion or hallucination in the persons affected. The intellectual faculties appear to have sustained but little injury, whilst the feelings and affections are perverted and depraved, and the power of self-government is lost or greatly impaired. * * In some instances, the *impulses* and propensities to which the patient is subject, or which he has indulged, are so exalted or disordered as to constitute the sole manifestations of insanity, as ably insisted upon by Reil, Hoffbauer, &c. Dr. Pagan states, that 'disease of the moral faculties may exist, when it is impossible to discover any intellectual disorder.' * * Marc relates facts, which, he observes, display a struggle in the mind of the individual between the instinctive desire which constitutes the whole manifestation of disease, and the judgment of the understanding still unaffected and struggling against it. Prichard remarks, that 'individuals labouring under this disorder, are capable of reasoning or supporting an argument on any subject within their sphere of knowledge, and often display great ingenuity in giving reasons for their eccentric conduct, and in accounting for and justifying the state of moral feeling under which they appear to exist.' 'There are madmen,' Esquirol observes, 'in whom it is difficult to discover any traces of hallucination: but there are none in whom the passions and moral affections are not disordered, perverted, or destroyed. I have in this particular met with no exception.' * * It is under this division of insanity that the commission of acts of violence frequently occurs. In many it displays itself in an irresistible propensity to commit murder (homicidal moral mania, and suicide), in others to commit theft: in some the principal or sole manifestation, is a propensity to break or destroy whatever comes within reach of the individual. Many lunatics of this class have felt themselves impelled to set fire to buildings, often of the most venerable description."

Referring to the indisposition of English lawyers to admit the existence of moral insanity, Dr. Gavin arrays the following witnesses in behalf of its reality:—

"Facts well authenticated, and the opinions of practical men, established upon the ground of experience, authorize a very different conclusion. Abroad, Otto, Esquirol, Gall, Spurzheim, Broussais, Orfila, Andral, Marc, Georget, Michu, Guislain, Ray, Rush, Reil, Platner, Ethmuller, Henke, and many others, have avowed their belief in the various forms of homicidal insanity: while in this country, Drs. Prichard, Elliotson, Burrow, Mayo, Pagan, Combe, Conolly, Dr. Wake, of York, Drs. Bompas Fox, and Symonds of Bristol, Mr. Hitch of Gloucester, and many others, are among the supporters of the doctrine. The German writers, Hoffbauer, Reil, and Heinroth, admit, more or less distinctly, the existence of moral insanity, or of a mental disease consisting exclusively in undue and morbid excitement of the passions and feelings. But neither they nor Pinel have assigned to moral insanity so general a description as the truth warrants, nor have they referred to it all the different forms which really belong to it."

That these witnesses are trustworthy few will be disposed to deny; and yet, if their testimony contain the truth, the inferences to be drawn from their statements are obvious; and they are of the most melancholy character:—

"Dr. Georget believes that madmen have died upon the scaffold, and that others have undergone every mark of infamy. Marc likewise observes, that homicidal monomania has brought to the scaffold many deplorable victims, who merited compassion rather than punishment. Prichard also states, that it is not to be doubted that men have been occasionally executed as criminals, who, if they had been kept in confinement, would have proved to be insane. Ray states, that of the double homicides to which this affection has given rise, there can be no question which is most to be deplored; for shocking as it is for one bearing the image of his Maker to take the life of a fellow-being with brutal ferocity, how shall we characterize the deliberate perpetration of the same deed under the sanction of law, and with popular approbation? It has been well remarked, that until the existence of moral insanity is distinctly recognized, there will always be a danger of this event ensuing on the trial of mischievous lunatics."

The homicidal monomania presents itself in two forms, as it exists with and without hallucinations:—

"In the first form the murderer is hurried on by a strong but delirious conviction, by the exaltation of a wandering imagination, by false reasoning, or by maniacal passions; is always excited by an acknowledged and unreasonable motive; the understanding is disordered under the influence of a false perception, or of a delusion momentarily entertained, and the insane person acts under an error of judgment, and always offers sufficient signs of partial aberration of intelligence or of the passions. This class is undoubtedly *monomania*—partial intellectual mania. In the second form, the homicidal moral maniac shows no appreciable alteration in his intelligence or passions [save only the insane passion for blood]. Reasoning and judgment are suspended; he is led on by a blind instinct—by an idea—by some undefinable feeling—which prompts him to kill. This insane impulse impels and directs the will without any effort of the understanding or of the moral powers to prevent the act. Even when his conscience recoils with horror from the act which he is about to commit, the unbalanced will is overcome by the force of that feeling which hurries him on. The murderer, uninfluenced by delirium, or emotion, or passion, and almost without consciousness, is led on by an irresistible power; by a force which he cannot overcome; by a blind and instantaneous impulse; by an undeliberated determination independent of the will, and before which reason and judgment are for a moment entirely prostrate; one cannot divine that which prompts him—without interest, without motive, without intellectual aberration,—to an act so atrocious, and so contrary to the laws of nature."

Of the connexion between homicidal mania and suicide, Dr. Gavin presents very nearly the same language as that we have quoted from Mr. Sampson [*Athen.* No. 803]: we need not therefore repeat it.

On the discriminating tests between disease and criminality in these cases, Dr. Gavin observes:—

"Homicidal moral maniacs are lonely, without accomplices who can excite them by their counsels or their example, and are frequently hereditarily predisposed to insanity. Criminals have their companions in immorality and debauchery, and usually their accomplices, and do not exhibit this predisposition. In the history of the homicidal moral maniac, it will be found that the impulse to destroy has been powerfully excited by the sight of murderous weapons, by favourable opportunities of accomplishing the act, by contradiction, disgust, or some other equally trivial, and even imaginary circumstance. The criminal has always a motive; the murder is for him only the means to an end; it is to satisfy a more or less criminal passion, and has an obvious reference to the ill-fated victim, and is nearly always complicated with some other criminal act. * * The criminal never sheds more blood than is necessary for the attainment of his object; the homicidal moral maniac often sacrifices all within his reach to the cravings of his murderous propensity. The criminal lays plans for the execution of his designs; time, place, and

weapons are all suited to his purpose. The homicidal moral maniac, on the contrary, for the most part, consults none of the usual conveniences of crime. If, as sometimes happens, he does prepare the means, and calmly and deliberately executes his project, his subsequent conduct remains the same. * * The criminal selects his victims from those who may present obstacles to his designs, or who may inform against him. The acts of the moral maniac are in opposition to the influence of all human motives; he immolates those beings to whom he is indifferent, or who have the misfortune to come in his way at the time when he is seized with the idea of murder; but more frequently he chooses his victims among those who are most loved and cherished by him; and it is remarkable how often they are children, and especially his own offspring. A mother kills her infant and not the child of a stranger; a husband destroys the wife with whom he has lived in harmony for twenty years; a daughter wishes to murder the mother whom she adores. * * The subsequent conduct of the unfortunate moral maniac is generally characteristic of his state. When he has accomplished his momentary design, he has no more upon his thoughts: he has killed, he has finished everything, his end is attained; after the murder, he is collected, and does not think of concealment. He testifies neither remorse nor repentance, nor satisfaction. Sometimes, satisfied, he proclaims that which he has done, and surrenders himself to the nearest magistrate; and describes the state of mind which led to the perpetration of the deed."

Means of defence are not then wanting against the pseudo-maniac, nor can there exist any dangerous peculiarity in the disease, which will stand in the way of substantial justice, where crime has really been committed.

We have only further to say, that Dr. Gavin's book will serve as a convenient index to the medical literature of his subject, and that the spirit which pervades his volume is that of an enlightened and humane philosophy.

Austria. By J. G. Kohl. In Two Parts.—Part I. *Vienna, Prague, Hungary, Bohemia, and the Danube.* Chapman & Hall.

To travel or not to travel—to stroll through the world, or to remain at home, and shoot out roots like a tree—were the perplexing doubts which troubled our worthy friend Kohl after his return from Russia. Fortunately for the public, he decided on abandoning all thoughts of a quiet little farm on the banks of the Elbe, and to trust himself to a Hungarian Bauerwagen, and commence a journey through the Austrian dominions. Kohl, as our readers know, is no idler—and no sooner had he set foot in Teplitz than forthwith he booked a group of Polish Jew pedlars, that might well serve our purpose, but that we had rather push on to Prague, and have a picture on a larger scale. The Jewish community of that ancient city is equal to one-fifth of its whole population. How long they have been settled there is a question open to discussion, and the disputants differ somewhere about a thousand years. Without offering an opinion on this subject, Kohl observes that the Jewish cemetery has all the outward appearance of great antiquity:—

"The cemetery lies in the very heart of the *Judenstadt*, where it is encircled by buildings and narrow lanes. Its form is very irregular, winding, now broad and then narrow, amid the houses that overtop its lofty wall. This very irregularity of form seems to speak in favour of the high antiquity of the place, to which, through succeeding centuries, a fragment seems now to have been added here, and now there. In the central part of the enclosed space, the tombstones are crowded together in a manner I never saw equalled anywhere else. Close to the wall, on the inside, is a footpath, and a man must walk tolerably fast to make the round in a quarter of an hour. The Jews do not, as we do, inter fresh corpses in graves whose former tenants have mouldered into dust, but always place their dead either over or by the side of each other. This practice occasions the astonishing accumulation of tombstones, of which I am sure there are several hundred thousand in this cemetery. They have all a family resemblance, being four-cornered tablets, with neatly-executed inscriptions. They stand literally as close together as ears in a cornfield. All are carefully preserved, though some have sunk more or less into the ground, so much so, that here and there you see a stone, of which only a portion is still visible. The whole is overgrown with elder bushes that stretch their knotty and confused branches from stone to stone. These elders are the only trees that grow there, and some of them seem to be nearly as old as the stones which they overshadow. The presence of the elder tree in burying-grounds is not, however, peculiar to this place, but prevails very generally throughout Bohemia. Here and there a small path winds among the thicket of tombstones and elder trees, and on following it you come to small elevated spaces of ground, that have been left unoccupied, and are now overgrown with grass. * * The inscriptions are nearly all in Hebrew. Nowhere did I see a Bohemian inscription, and only here and there, on a stone of comparatively modern date, has the German language been used. The year is always at the top. The tombs of those of Aaron's race are distinguished by two hands graven into the stone, and those of the Levites by a pitcher, to mark the office of the latter to pour water on the hands of the former, when performing their ablutions in the temple. The descendants of Aaron never visit the cemetery during their lives. Any contact with, or even a near approach to, a dead body, is a pollution for them. They may not, therefore, remain in a house in which a dead body is lying. There is but one exception made to this law, namely, when the father of an Aaronite dies, in which case the son may come within three ells of the body, and following it to the burying ground, till within three ells of a grave. The Jewish laws even prescribe the distance at which an Aaronite must keep when passing a burying-ground, which distance, however, is not calculated from the outer wall, but from the nearest grave. Now, in Prague, it happens that one street passes close to this wall, and that just in this spot the graves not only reach up to the very wall, but that some are even supposed to lie under the pavement of the street. This would, consequently, be a forbidden road to every Aaronite, had not particular arrangements been made to provide a remedy. This has been done by undermining that part of the street, and the empty vaulted space thus obtained, protects the Aaronite against pollution, for, according to the law, one hundred ells of vaulted space are deemed equal to one thousand filled with solid earth. Here, as in every other Jewish cemetery, a piece of ground has been set apart for the interment of children stillborn, or of premature birth. In the course of time, this portion of the cemetery has grown into a hill or mound, eighty paces long, ten paces broad, and twelve feet high. *Ephel* is the Hebrew word for a child whose life does not extend beyond the fourth week, and *Ephel* is the name given by the Jews to this mound formed of infantine remains. Close to this *Ephel* are situated some old houses that seem to be on the point of falling in. They are propped up by beams resting on the Ephel; thus the mouldering bones of deceased infants lend their support, perhaps, to the tottering dwelling-places of their living parents. When, some sixty years ago, the Emperor Joseph prohibited all future interments within the walls of the city, the Jews had purchased a small piece of land, and consecrated it as an addition to their cemetery. Having once been consecrated, though not one body has been interred there, the ground has become holy, and may not be sold again; but though it may not be sold, it may be let for hire, and accordingly a dealer in wood has become the tenant, and uses the place as a depot for his merchandise. The whole cemetery, since Joseph's time, has been only an interesting piece of antiquity, still no portion of it can be sold or built upon."

At the Cistertian convent of Osseg Kohl found a picture gallery, rich in legendary lore. One picture represented—

"A Cistertian of the name of Daniel, who studied and read so indefatigably in his solitude, that the flames of his holy zeal issued forth at his fingers' ends, so that he could hold them, at night, like so many little tallow candles before his book. This allegory is a beautiful one; for no doubt there is within the human breast a self-illuminating power, that enables the possessor to read the mysteries of God without the aid of a teacher; but in the way the painter has placed his subject before us, it loses all dignity, and looks rather as if the artist had designed to turn the matter into ridicule."

At the treasury of the Metropolitan church he records—

"In one cabinet I counted no less than 32 golden mitres. I took several of them in my hand, and observed to my guide that I thought them heavy. 'And yet, sir,' said the man, archly, 'our gentlemen are so very fond of wearing them!' In various drawers are preserved no less than 368 priestly vestments for the service of the mass, many of them of astonishing richness and splendour. One of them was of a material that might have furnished a mantle, either for a beggar or a prince; it was of common straw, but plaited and worked with such surprising art, that the whole looked like elaborate embroidery. Most of these vestments are gifts from Bohemian nobles, and the history of some of these presents may contribute to illustrate the character of the country. Thus, one vestment has been made up from the bridal dress of a Countess Tshernin, another of the coronation robes of Maria Theresa. One of the richest of all, and which is only displayed on occasions of great solemnity, has been decorated by the Prince Schwartzenburg with a number of golden bunches of grapes and vine-leaves, and with all the buttons worn on his wedding coat. Each of these buttons is a jewel of considerable value, fashioned into the form of an animal, and set in gold. What wasteful profusion! and what a strange whim, to dedicate the wedding dresses of lords and ladies to the service of the church!"

Kohl visited the celebrated University library—a university which once, according to tradition, contained 60,000 students! on which Kohl significantly observes, "unless it had more books than it has now, the whole library must have been exhausted if only each student occupied one work at a time." But it is not without some rarities.

"One of the most curious, is perhaps, a Hussite hymn-book, which is written and illuminated with singular splendour. The book, which must have cost many thousands of florins, was the joint production of a large portion of the inhabitants of Prague. Every guild and corporation of the city had a few hymns written, and pictures painted to accompany them, and several noble families did the same, each family or corporation placing its arms or crest before its own portion of the book."

The mention of Huss draws forth some reflections on that tremendous revolution, which shook Bohemia to its foundations, and has left no trace behind—a proof of the fallacy of the common assertion, that persecution only fans the flame it strives to put out. Let but the persecution be in earnest—no dallying with fire and sword,—no half measures,—and let Spain and Bohemia tell what may be effected by it. Mr. Kohl shall answer for Bohemia:—

"Poor Huss raised a flame in which he himself was burnt, as well as many that came after him, but from that flame posterity has derived neither light nor warmth. The history of the Calixtines of Bohemia is a sadder one than that of any other religious sect, for no doctrine ever made its way amid acts of greater violence, and none was ever annihilated by a more ruthless reaction. Lutheranism was also cradled amid fearful storms, but the tempests have spent themselves, and millions have become peaceful participators in the blessings at which Lutheranism aimed. The Hussites raised a mighty conflagration, of which the Austrians succeeded in treading out the last spark; the Lutherans lighted a roaring fire on their own hearths, and their homes, in spite of pope and emperor, have been warmed by its genial influence ever since. Yet Huss, despite of his heresy, lives in the affections of his countrymen. I have often observed in them a strange struggle, on this score, between religion and nationality. As Bohemians they love to take credit for all the great things

that the Hussites did, though as Catholics they cannot, of course, approve of them."

The lunatic asylum at Prague is spoken of as being very well conducted. The straight jacket is the only means of coercion or punishment employed, and every available means are taken to amuse the lunatics:—

"It is characteristic of music-loving Bohemia, that in the lunatic asylum of its capital, music should be considered one of the chief instruments for the improvement of the patients. In addition to the garden concerts, in which all assist who can, there are quartettos every morning and evening in the wards, and a musical director is appointed for the express purpose of superintending this part of the domestic arrangements."

One of the patients was the well-known Orientalist Sieber.

The beauty of the ladies of Prague, which struck Mr. Kohl as remarkable, gives rise to some speculations on the reason of their being so generally handsome:—

"That the little ugly, squalling, red-faced creatures (for all newly-born babies are alike) should grow up in Prague into such remarkably beautiful girls, is one of those phenomena of nature which I cannot take upon myself to explain. Some have attributed the fact to the mingling of German with Slavonian blood, but this the Slavonians protest against most loudly, telling you that in the villages of the interior, where no such mixture of the races has taken place, much finer specimens of female beauty are to be found, than in any of the frontier districts. The members of the Bohemian Patriotic Association boast, moreover, that by far the richest display of beauty is to be seen at their balls, where nothing but Bohemian is ever spoken, and where, consequently, the bulk of the company must be genuine Slavonian; nay, even the far-famed beauty of the Hungarian ladies is attributed by these zealous patriots to the mixture of Slavonian blood with that of the original races. The theory is not one that I would at once reject as absurd. On the contrary, I often fancied, in the course of my subsequent wanderings, that I saw reason to believe there was some ground for it. Be this, however, as it may, Prague is decidedly a very garden of beauty. For the young ladies of 1841, I am ready to give my testimony most unreservedly, and many an enraptured traveller has left us his books as living witnesses to the loveliness of the grandmothers and great grandmothers of the present generation. The old chronicler, Hammerschmidt, and his contemporaries, dwell with equal pleasure on the sweet faces that smiled upon them in their days, and the picture gallery of many a Bohemian castle is there to testify to the truth of their statements. One witness there is to the fact, whose right few will question to decide on such a point. Titian, who studied the faces of lovely women for ninety-six years, and who, while at the court of Charles V., spent five years in Germany, tells us, it was among the ladies of Prague, that he found his *idéal* of a beautiful female head. If we go back beyond the times of Titian, we have the declaration of Charles IV. that Prague was a *hortus deliciarum*, and whoever has read the Life of that emperor, will scarcely doubt that beautiful women must have been included in the delights of a capital so apostrophized. Nay, the time-honoured nobility of the beauty of Prague, may be said to go back even to the earliest tradition, where we find it celebrated in the legends of Libussa and Vlasta, and the countless songs composed in honour of the *Devìy Slavanske* or Tshekhian damsels."

The movement now going on in Bohemia is discussed by Mr. Kohl, who gives one remarkable instance of patriotic self-sacrifice. A Mr. Jungmann, a zealous Bohemian patriot, has lately published a dictionary of his country's language (the first good one that has ever been executed), and sold a vineyard to defray the expense. His compatriots, however, do not seem to have come forward very liberally to his aid: and this fact leads Mr. Kohl to doubt whether the feeling for liberty and their country be so strong and powerful among the Bohemians, as has been represented. He quotes the opinion of a Bohemian gentleman on the subject, which will possess some interest for our readers, and we will give it entire:—

"'It is a kind of luxury,' said he, 'in which a few idle young men indulge, and in which they are encouraged by the professors and antiquaries; but it is no movement originating in the wants, or emanating from the wishes, of the people. All that is eminent with us is German. Our men of education read Schiller and Goethe in preference to any other writers; every official man, down to the humblest clerk, writes and speaks German; and as every Bohemian feels that he cannot get on in the world without a knowledge of German, he seeks to learn it himself, and teach it to his children, and has no time to trouble himself about the fantastic visions of the Tshekhian patriots. Besides, the German language is taught, *ex officio*, in every school, and many of our gentry do not even understand the patois of the country. With all these mighty agents at work, what avail the efforts of a few enthusiasts? The government, meanwhile, feels itself strong enough to let the Tshekhian party go their own way. Foreigners, moreover, are deceived, if they attribute to politics all that is done here in the way of Slavonian investigation. The inquiring spirit of the time, the revived fondness of everything that tends to the illustration of antiquity, has led to similar efforts in other countries, as well as in those inhabited by Slavonians. Every province in Europe has been burnishing up its recollections; every city has been turning over the leaves of its chronicles, and repairing its cathedral or its townhouse. Not only the Slavonian provinces, but all the provinces of Austria, have been collecting their antiquities, dusting their records, and new binding their chronicles. The same has been done in the provinces of Prussia, and indeed in the provinces of almost every European country. We have seen Ossian's literature rescued from its tomb in Scotland, and in Germany we have seen Voss writing poems in *Platt Deutsch;* we have seen Westphalian, Saxon, and Brandenburg Associations, not to speak of hundreds of other provincial societies; and thus the fashion has reached Bohemia at last. It is not any inclination on the part of the Western Slavonians to accept the fraternization offered them from the East, that has led to all these Slavonian journals, grammars, dictionaries, and poetical anthologies. In England, and even in France, books and newspapers have been printed in the local dialects, and so in Russia have works been of late published in Lettish and Esthonian, languages of which, some years ago, no cultivated man made use, unless perhaps in the pulpit. It is not to be denied, that the provincial, literary, and patriotic movements in the Slavonian provinces of Austria, acquire a peculiar character from the spirit of Panslavismus, of which so much has been heard of late years. No nation, while yet a breath of life is in it, becomes reconciled to the loss of its independence; and though the Bohemians, the Slovaks, and the other Slavonians, would do better to attach themselves more and more to the mild sceptre of Austria, than to stretch out their hands after the questionable independence which seems to be offered them from the East, yet nations, like individuals, are not exempt from acts of folly, prejudicial to others as to themselves; and for their own sake, therefore, as well as for Austria's, the Bohemians must be watched. The classes, however, which have most influence in the country, are the least disposed to sympathize with Russia. The clergy and the nobility know how little they would be likely to gain by exchanging the sovereignty of Austria for that of Russia. Recent events in Poland have likewise much contributed to cool the enthusiasm formerly manifested for Russia. The less instructed Bohemians, indeed, look upon much that they hear of Russia as mere German calumnies; but those among us, who stand higher, have had opportunities, many of them, of seeing with their own eyes. In short, should it ever come to a struggle between the Slavonian and German elements, the Tshekhs, in spite of their sympathies and antipathies, will be found fighting on the side of the Germans, and it will be for their own advantage to do so.'"

We must not forget the glass-warehouses of Prague, before we leave that celebrated city:—

"The workshops are generally at some distance in the country; but the warehouses in Prague, for the greater part, are the property of the manufacturers. These have chemists and artists in their pay, who are constantly tasking their invention to extend the domains of glass, by discovering new articles that may admit of being formed of so brittle a material, and to give new colours and forms to those articles which the glass-cutters have long looked upon as belonging to their legitimate sphere. Of each new discovery or modification a drawing is made, and a copy sent to the manufactory. The drawing and the copy bear corresponding marks and numbers, so that if a sudden demand comes to the warehouse for any particular article, all that is necessary probably is to send an order down to the country, to make up immediately so many dozens of B 288, or whatever else the number may be. I was allowed to look over a number of these drawings, which were neatly bound up in folio volumes, and I was astonished at the immense variety of designs and inventions for coffee, ten, and milk pots; at the endless modifications of form which so simple an article as a glass stopper was made to undergo; and at the prodigality of ingenuity that had been expended on varying the conformation of a thing so unimportant as a lady's smelling-bottle. In the different shades of colour there was almost as much variety as in the form; yet the prevailing taste appears to be always, in the long-run, in favour of that which is most simple. The plain, pure, colourless, crystalline glass has always been in favour, and will maintain its supremacy in the end, however taste may sport for awhile among the brilliant colours and variegated forms which science has found the means of imparting to this beautiful manufacture. All the bright 'Leonore greens' and 'Chrysopras' of 1840, and the 'Anne green,' the 'gold glass,' the 'dead glass,' and the 'alabaster' of 1841, may hold their place in public favour for a time; but they will have passed away, when the pure crystal will be prized as much as ever."

We must conclude for the present with a sketch of a Bohemian railway—

"The Linz-Budweis railroad is the grandmother of all the railroads on the European continent; and taking this into consideration, we must not deem it matter of surprise to find it manifesting occasionally some symptoms of the debility of old age. It was the *coup d'essai* of Baron von Gerstner, who afterwards laid down rails in Russia, and died in America. He had great natural difficulties to contend with in the mountainous region over which his road had to be carried. To overcome these difficulties he was obliged to make his railroad take so circuitous a route, that though the distance between the two towns, in a straight line, is not more than ten (German) miles, the railroad has a length of seventeen. After arriving at Linz, the railroad is carried ten miles further to Gmünden, for the convenience of the government salt-works at that place. The railroad from Budweis to Linz cost 1,700,000 florins. It consists of a single pair of rails, with arrangements at intermediate stations to enable two trains to pass each other. The rails are partly of Styrian, but chiefly of Bohemian iron; partly cast and partly wrought. In many places they seem sadly in want of repair. Some have been completely worn away, others have lost their nails, and stand up from the wooden sleepers to which they were originally fastened. Sometimes a very sensible jolt of the carriages reminds the passengers of a striking difference between the respective altitudes of two succeeding rails; at other times a drag must be put upon the wheels, to prevent the train from rattling down the hill at too rapid a pace. My journey was performed immediately after rainy weather, which had made the rails extremely dirty and slippery; and I find, from a memorandum in my journal, that our wheels occasionally sunk into soft earth. It is evident from all this, that this railroad must have been left in a very neglected condition; but its importance to the commerce of the Danube is so great, that the government will be obliged, before long, to step in, and, by a timely treatment, endeavour to save this grandmother railroad from an untimely fate. The trains on this railroad are drawn by horses, and owing to the inequalities of the ground over which it passes, there is little likelihood that steam locomotives can ever be introduced there. One horse generally draws two or three carriages; but sometimes two or three horses are yoked on, in which case the train consists of six,

seven, or even eight carriages. On an average, a horse is able to draw from seventy to a hundred cwt. at a slow walk; the trains for passengers travel at a smart trot. On the common road, in this mountainous district, a horse cannot draw more than twelve cwt."

Aunt Elinor's Lectures on Architecture, dedicated to the Ladies of England. Rivingtons.

BRIEF as it is, the title-page of this little volume says a great deal, intimating as it does that we may expect shortly to have not only additional *lay*, but also *lady* students in architecture. Multifarious as are the pursuits and accomplishments of modern female education, women have hitherto been privileged to avow utter ignorance of architecture, although it ranks as one of the fine arts. It may indeed be said that as an acquirement, it would be quite useless to them; yet at that rate a good many other female studies might be put under ban. What is there of particular and obvious utility to women in the study of botany, mineralogy, conchology, geology, and some of the many other *ologies* to which they apply? or in that of chemistry when they scorn to cultivate that truly domestic species of it—the chemistry of the kitchen? Surely it would be quite utility enough if the study of architecture afforded them an intellectual occupation which would tend to improve their taste, and enable them to relish far better than they can do at present, an extensive and varied department of art. Besides, in this age of travellers and tourists, some knowledge of architecture becomes almost indispensable, since without it those who visit foreign cities are very much in the condition of a blind man in a gallery of pictures;—or if they see, they must both see and afterwards speak according to the traveller's oracle—the 'Guide-Book.'

Very easily might we extend these remarks; but what we have said will serve to call attention to what is one particular object of Aunt Elinor's work. Still, while we are willing to hail her book as being in that respect of favourable augury, we do not approve of all "Aunt's" views; nor can we by any means compliment her on having produced a work likely to render the study attractive to females. So far from being at all "popular" and calculated to interest the beginner, her mode of teaching is exactly the reverse; nor does she seem to have any idea of the difficulties that are most likely to be felt at the outset, and ought therefore to be cleared away in the first instance. Even where no more than a mere sketch or introductory outline of a subject is professed to be given, brevity alone does not tend to facilitate an acquaintance with it; on the contrary, rather to cause it to appear dry, fatiguing, and uninteresting.

This has always appeared to us one great defect of most elementary books: professing to be familiar, and to serve as a "short cut" to the subject treated of, they are frequently very difficult and obscure; and no wonder, for instead of being composed with a view to their particular purpose, many of them seem to be only the siftings obtained from more complete treatises, by no other process of abridgment than that of mere erasure,—of omitting what may appear superfluous for a beginner, but without attempting to supply that explanation which is indispensably requisite for him. One important point in the art of teaching is to put the learner in the way of teaching himself; which is certainly not to be accomplished by affording him only partial and indistinct glimpses of the subject. It is true that having obtained some general insight into it, from a slight introductory sketch, the student may afterwards enter into it as fully as he pleases, and where there is a strong natural relish for it, such will be the case; but then how many are there who abandon it in despair or disgust, owing to no interest having been imparted to it in the books that have professed to initiate them into its rudiments.

Aunt Elinor's first Lecture, which is on the subject of the ancient orders, affords a very notable specimen of that mode of elementary instruction which we are inclined to deprecate. It cannot, indeed, be objected, that it is tediously long, but it certainly is miserably dry and jejune, amounting to no more than a few bare definitions, without attempt at explanation or instructive comment. The characteristics of the respective orders are merely specified without being described, much less accounted for; and what is not a little singular, no notice is taken of their proportions, not even so as to give an idea how those proportions are computed, and that the lower diameter of the column is taken as a scale for the whole order. Neither is information afforded as to anything further than the general composition of an order by itself, without reference to the mode in which it is employed. It may, therefore, easily be guessed how far the beginner is put into a proper and intelligent way of study.

It may, perhaps, be some excuse for this lame and bald account of the ancient orders, that it may be passed over altogether, as having no connexion with what follows; for though it is not so intimated by the title, these Lectures do not treat of architecture generally, but merely of that of our own country, and only one particular class of it—namely, the Ecclesiastical. Consequently, Lectures on Church Architecture would have been a more suitable title,—hardly a less catching one just now, and it would have in some degree prepared us for the religious and polemical tone, which is not the least striking characteristic of the volume. Aunt Elinor is, in fact, a sort of Protestant Pugin in petticoats, almost equally hostile towards Pagan art, (with this difference, that she imputes its encouragement in modern times to popes and cardinals) —and equally disposed to rail at this money-making, steam-going, self-sufficient nineteenth century, for subduing and changing whose spirit they seem to consider Church Architecture an all-sufficient panacea.

Accordingly, not contented with "lecturing," Aunt Elinor must needs take upon herself to preach also; and preach she does, after a fashion that must have been more bewildering than instructive to her auditors, supposing her lectures to have been really delivered before children for their winter evening's amusement. Dealing in architectural mysticism, and laying very great stress upon symbolical meaning in design,* she attempts to render the study *edifying* in more meanings of the word than one; yet whether such views be, or be not, correct in themselves, they are altogether out of place in what purports to be a course of elementary instruction. Considered from this point of view, the book is unsatisfactory; at least, not more satisfactory than others of the kind, for although it contains much information, it omits a great deal which must first be understood, in order to render that information available and instructive. The writer strides too rapidly over the ground, and jumps over many essential particulars; the book will therefore hardly help those who now first seek information on the subject,—if only because the respective architectural members and features are neither described nor delineated, but spoken of as if sufficiently well known. All that is given in the way of illustrations are five specimens of arches and the heads of doorways, which seem to have been taken at random, and which certainly are utterly inadequate to convey any notion of the multifarious elements and characteristics of so complex and diversified a style, or series of styles, as the Gothic. We are aware that in order to elucidate such style of architecture satisfactorily, a most extensive series of illustrations would be required; and it is, no doubt, owing to this circumstance, that numerous as are the publications on Gothic architecture, there is not yet any single one which furnishes a complete and systematic course of instruction. The subject is treated rather historically than elementarily, and with comparatively very little of architectural or critical remark, properly so called. It is true a great stock of information has now been provided, but it is scattered about fragmentarily, and the student has to collect and arrange it for himself. Attention is directed rather to dates and matters of history than to architectural principles and characteristics, except as these last serve to discriminate one period of the style from another, as its indicial marks. The consequence is, that in copying, the real spirit of the style is missed, though such "marks" are kept up; no account being taken of a variety of circumstances, all more or less influential in design, yet which do not admit of being described or defined like the separate members and positive features of an edifice.

It would, perhaps, be too much to expect that Aunt Elinor should be the first to direct attention to matters of the kind just alluded to, especially when she could find such a topic to expatiate upon as that of "Fonts and Altars," to which she devotes an entire lecture! The Font is considered by her, if not exactly as an object of devotion, one to which peculiar sanctity is attached, therefore not to be treated as mere matter of taste, but according to orthodox precedent. Yet how far ancient precedents can always be followed with propriety, is, upon her own showing, somewhat doubtful, since she informs us—

"At St. Nicholas' Church, Brighton, there is a very curious font, which some persons have imagined to be a trick upon antiquaries, *i. e.* an imitation of an early Norman font, carved in modern times. The clearness and freshness of the sculpture is wonderful; the figures are grotesque and ludicrous, yet there is spirit and expression in some of them. One side represents the sacrament of the Lord's Supper; our Saviour is in the act of blessing the bread, and the Apostles lift up their hands and eyes in utter amazement at the miraculous change. If this font be really ancient, then there is nothing irreverent about it, as the figures carved by a rude people would not be ludicrous in the eyes of those who could make nothing; but if it be the work of a modern artist, and executed by way of joke, it is a melancholy specimen of perverted skill—I may say of shocking profaneness."

It would seem, then, after all, that propriety or impropriety in such matters depends greatly upon circumstances, and that the very same thing may be either becoming or objectionable according to the particulars of the case. This cannot be altogether disputed, yet, being admitted, it rather makes against the writer's views than for them, since what is said tends to show that what would formerly have been harmless, may now be reprehensible, not to say scandalous. If the figures alluded to be actually "grotesque and ludicrous," it matters not, as far as we are concerned, whether their being so is the result of ignorance and bad taste, or of malicious intention; to us they seem ludicrous, consequently for us they are improper. The case is the same with many other things and matters on which this writer and the Church Revivalist party lay great stress. Many forms and observances, which some centuries ago were in accordance with the then spirit of the age, would, at the

* Of the fanciful notions entertained by some on this subject, an idea may be formed from what is said relative to it, in a notice of Lewis's 'Illustrations of Kilpeck Church,' (*Athen.* No. 778).

present day, appear both superstitious and fantastic—at the best, unmeaning. Had they been kept up in full force till now, it might have been a question how far it would be prudent to lay them aside; but to attempt to revive them, as is now being done, after they have long become obsolete, is a different matter from merely retaining what had never been discontinued. The reform or change in regard to matters of ceremonial or etiquette in church service and church architecture, which is now contended for in certain quarters, is, in itself, hardly worth the clamour and scandal it has occasioned; therefore, suspicion is very naturally excited, and room is afforded for supposing that the real object is as yet kept in the background, and that having been enticed to return to forms, we are to be trapped into returning to doctrines. If it is not meant to re-enlist us under the banners of Romanism, why should we be asked to put on its colours, and wear what looks like its badge?

Of Romanism there is certainly some *tinge* in Aunt Elinor's Lecture; nor does she confine herself very strictly to matters of church architecture alone, but expatiates on other topics, some of them hardly suited to her auditors. Not content with recommending religious embroidery, and the meritoriousness of presenting altar-cloths and other ornamental productions of needle-work to churches, she goes on to advocate female celibacy on religious motives. Celibacy among women, and that from choice, is, she assures us, on the increase, notwithstanding that, as she oddly expresses it, "*certainly* the education so common now-a-days, unfits women for a single life to a remarkable degree." We are not skilled in the statistics of matrimony, and the subject is rather too delicate for discussion; but it is not easy to reconcile the prodigious increase of population with Aunt's assumed growing popularity of celibacy. It is, however, upon such grounds that she founds an argument for such change in female education and pursuits as would serve as a preparation and training up for a life of "single blessedness."

We have said enough to give an idea of the peculiar views inculcated in these Lectures, which are by no means confined to architectural subjects.

Wyandotté, or the Hutted Knoll. By J. Fenimore Cooper. 3 vols. Bentley.

To those readers who find the chief attraction of Mr. Cooper's novels in his narratives of "moving accidents by flood and field," his accounts of hair-breadth escapes from Indian savages or government cruisers, we cannot promise much interest in 'Wyandotté:' even to those who are wont to be gladdened by the joyous descriptions of scenery wild and free, with which this author's tales generally abound, we can offer less than their usual treat; while to all those who prefer a calm and domestic peace, and everyday unheroic trials and characters, we can promise a full and fair enjoyment. There is scarcely a scene of wild interest in the whole tale, and yet it is not tiresome or tedious. It relates the fortunes of a British officer and his family, settled near the Susquehannah, on a spot called "The Hutted Knoll," at the outbreak of the American revolution. The progress of the family to their future home is thus described: Capt. Willoughby, with his daughter, his adopted daughter, and his wife, leave the town of Albany for their wild habitation.

"Mrs. Willoughby had often overcome, as she fancied, the difficulties of a wilderness in the company of her husband.—It is the fashion highly to extol Napoleon's passage of the Alps, simply in reference to its physical obstacles. There never was a brigade moved twenty-four hours into the American wilds, that had not greater embarrassments of this nature to overcome, unless in those cases in which favourable river navigation has offered its facilities. Still, time and necessity had made a sort of military way to all the more important frontier points occupied by the British garrisons, and the experience of Mrs. Willoughby had not hitherto been of the severe character of that she was now compelled to undergo. —The first fifty miles were passed over in a sleigh in a few hours, and with little or no personal fatigue. This brought the travellers to a Dutch inn on the Mohawk, where the captain had often made his halts, and whither he had, from time to time, sent his advanced parties in the course of the winter and spring. Here a jumper was found prepared to receive Mrs. Willoughby; and, the horse being led by the captain himself, a passage through the forest was effected as far as the head of the Otsego. The distance being about twelve miles, it required two days for its performance. As the settlements extended south from the Mohawk a few miles, the first night was passed in a log cabin on the extreme verge of civilization, if civilization it could be called; and the remaining eight miles were got over in the course of the succeeding day. This was more than would probably have been achieved in the virgin forest and under the circumstances, had not so many of the captain's people passed over the same ground going and returning, thereby learning how to avoid the greatest difficulties of the route, and here and there constructing a rude bridge. They had also blazed the trees, shortening the road by pointing out its true direction. —At the head of the Otsego our adventurers were fairly in the wilderness. Huts had been built to receive the travellers; and here the whole party assembled, in readiness to make a fresh start in company. It consisted of more than a dozen persons in all; the black domestics of the family being present, as well as several mechanics whom Captain Willoughby had employed to carry on his improvements. The men sent in advance had not been idle, any more than those left at the Hutted Knoll. They had built three or four skiffs, one small bateau, and a couple of canoes. These were all in the water, in waiting for the disappearance of the ice, which was now reduced to a mass of stalactites in form, greenish and sombre in hue as they floated in a body, but clear and bright when separated and exposed to the sun. The south winds began to prevail, and the shore was glittering with the fast-melting piles of the frozen fluid, though it would have been vain yet to have attempted a passage through it.—The Otsego is a sheet of water which we have taken more than one occasion to describe, and the picture it then presented amidst its frame of mountains will readily be imagined by most of our readers. In 1765, no sign of a settlement was visible on its shores, few of the grants of land in that vicinity extending back so far. Still the spot began to be known; and hunters had been in the habit of frequenting its bosom and its shores for the last twenty years or more. Not a vestige of their presence, however, was to be seen from the huts of the captain: but Mrs. Willoughby assured her husband, as she stood leaning on his arm the morning after her arrival, that never before had she gazed on so eloquent and yet so pleasing a picture of solitude as that which lay spread before her eyes.—'There is something encouraging and soothing in this bland south wind, too,' she added, 'which seems to promise that we shall meet with a beneficent nature in the spot to which we are going. The south airs of spring to me are always filled with promise.'—'And justly, love; for they are the harbingers of a renewed vegetation. If the wind increase, as I think it may, we shall see this chilling sheet of ice succeeded by the more cheerful view of water. It is in this way that all these lakes open their bosoms in April.'"

After a few amusing incidents, in which a blundering Irish servant figures conspicuously, they cross Lake Otsego, and soon arrive at their destination, which is thus introduced to the reader:—

"The appearance of a place in which the remainder of one's life is to be passed is always noted with interest on a first visit. Thus it was that Mrs. Willoughby had been observant and silent from the moment the captain informed her that they had passed the line of his estate, and were approaching the spot where they were to dwell. The stream was so small, and the girding of the forest so close, that there was little range for the sight: but the anxious wife and mother could perceive that the hills drew together at this point, the valley narrowing essentially; that rocks began to appear in the bed of the river; and that the growth of the timber indicated fertility and a generous soil. When the boat stopped, the little stream came brawling down a ragged declivity; and a mill, one so arranged as to grind and saw, —both in a very small way, however,—gave the first signs of civilization she had beheld since quitting the last hut near the Mohawk. After issuing a few orders, the captain drew his wife's arm through his own, and hurried up the ascent, with an eagerness that was almost boyish, to shew her what had been done towards the improvement of the 'Knoll.' There is a pleasure in diving into a virgin forest, and commencing the labours of civilization, that has no exact parallel in any other human occupation. That of building, or of laying out grounds, has certainly some resemblance to it, but it is a resemblance so faint and distant as scarcely to liken the enjoyment each produces. The former approaches nearer to the feeling of creating, and is far more pregnant with anticipations and hopes; though its first effects are seldom agreeable, and are sometimes nearly hideous. Our captain, however, had escaped most of these last consequences, by possessing the advantage of having a clearing, without going through the usual processes of chopping and burning; the first of which leaves the earth dotted for many years with unsightly stumps, while the rains and snows do not wash out the hues of the last for several seasons. An exclamation betrayed the pleasure with which Mrs. Willoughby got her first glimpse of the drained pond. It was when she had clambered to the point of the rocks where the stream began to tumble downward into the valley below. A year had done a vast deal for the place. The few stumps and stubs which had disfigured the basin when it was first laid bare, had all been drawn by oxen, and burned. This left the entire surface of the four hundred acres smooth and fit for the plough. The soil was the deposit of centuries; and the inclination, from the woods to the stream, was scarcely perceptible to the eye. In fact, it was barely sufficient to drain the drippings of the winter's snows. The form of the area was a little irregular, just enough so to be picturesque; while the inequalities were surprisingly few and trifling. In a word, nature had formed just such a spot as delights the husbandman's heart, and placed it beneath a sun which, while its fierceness is relieved by winters of frost and snow, had a power to bring out all its latent resources. Trees had been felled around the whole area, with the open spaces filled by branches, in a way to form what is termed a brush fence. This is not a sightly object, and the captain had ordered the line to be drawn *within* the woods; so that the visible boundaries of the open land were the virgin forest itself. His men had protested against this; a fence, however unseemly, being in their view an indispensable accessory to civilization. But the captain's authority, if not his better taste, prevailed; and the boundary of felled trees and brush was completely concealed in the back-ground of woods. As yet, there was no necessity for cross-fences, the whole open space lying in a single field. One hundred acres were in winter wheat. As this grain had been got in the previous autumn, it was now standing on the finest and driest of the soil, giving an air of rich fertility to the whole basin. Grass-seed had been sown along both banks of the stream, and its waters were quietly flowing between two wide belts of fresh verdure, the young plants having already started in that sheltered receptacle of the sun's rays. Other portions of the flat showed signs of improvement, the plough having actually been at work for quite a fortnight. All this was far more than even the captain had expected, and much more than his wife had dared to hope. Mrs. Willoughby had been accustomed to witness the slow progress of a new settlement; but never before had she seen what might be done on a beaver-dam. To her all appeared like magic; and her first question would have been to ask her husband to explain what had been done with the trees and stumps, had not her future residence caught her eye. Captain Willoughby had left his orders concerning the house,

previously to quitting the Knoll; and he was now well pleased to perceive that they had been attended to. As this spot will prove the scene of many of the incidents we are bound to relate, it may be proper here to describe it at some length. The hillock that rose out of the pond, in the form of a rocky little island, was one of those capricious formations that are often met with on the surface of the earth. It stood about thirty rods from the northern side of the area, very nearly central as to its eastern and western boundaries, and presented a slope inclining towards the south. Its greatest height was at its northern end, where it rose out of the rich alluvion of the soil, literally a rock of some forty feet in perpendicular height, having a summit of about an acre of level land, and falling off on its three sides,—to the east and west, precipitously; to the south, quite gently and with regularity. It was this accidental formation which had induced the captain to select the spot as the site of his residence; for, dwelling so far from any post, and in a place so difficult of access, something like military defences were merely precautions of ordinary prudence. While the pond remained, the islet was susceptible of being made very strong against any of the usual assaults of Indian warfare; and, now that the basin was drained, it had great advantages for the same purpose. The perpendicular rock to the north even overhung the plain; it was almost inaccessible: while the formation on the other sides offered singular facilities both for a dwelling and for security."

The wild desert is soon taught to blossom as the rose, and, some time after, we have the description of the Hutted Knoll:—

"The forest is opened, and the light of day admitted, it is true; but its remains are still to be seen in multitudes of unsightly stumps, dead standing trees, and ill-looking stubs. These vestiges of the savage state usually remain a quarter of a century; in certain regions they are to be found for even more than twice that period. All this, however, had Captain Willoughby escaped, in consequence of limiting his clearing, in a great measure, to that which had been made by the beavers; and from which time and natural decay had, long before his arrival, removed every ungainly object. It is true, here and there a few acres had been cleared on the firmer ground at the margin of the flats, where barns and farm buildings had been built, and orchards planted; but in order to preserve the harmony of his view, the captain had caused all the stumps to be pulled up and burnt, giving to these places the same air of agricultural finish as characterized the fields on the lower land. To this sylvan scene, at a moment which preceded the setting of the sun by a little more than an hour, and in the first week of the genial month of May, we must now bring the reader in fancy. The season had been early, and the Beaver Manor, or the part of it which was cultivated, lying low and sheltered, vegetation had advanced considerably beyond the point that is usual at that date in the elevated region of which we have been writing. The meadows were green with matted grasses, the wheat and rye resembled rich velvets, and the ploughed fields had the fresh and mellowed appearance of good husbandry and a rich soil. The shrubbery, of which the Captain's English taste had introduced quantities, was already in leaf, and even portions of the forest began to veil their sombre mysteries with the delicate foliage of an American spring. The site of the ancient pond was a miracle of rustic beauty. Everything like inequality or imperfection had disappeared, the whole presenting a broad and picturesquely-shaped basin, with outlines fashioned principally by Nature —an artist that rarely fails in effect. The flat was divided into fields by low post-and-rail fences, the captain making it a law to banish all unruly animals from his estate. The barns and out-buildings were neatly made and judiciously placed, and the three or four roads or lanes that led to them crossed the lowland in such graceful curves as greatly to increase the beauty of the landscape. Here and there a log cabin was visible, nearly buried in the forest, with a few necessary and neat appliances around it; the homes of labourers who had long dwelt in them, and who seemed content to pass their lives in the same place. As most of these men had married and become fathers, the whole colony, including children, notwithstanding the Captain's policy not to settle, had grown to considerably more than a hundred souls, of whom three-and-twenty were able-bodied men. Among the latter were the millers: but their mills were buried in the ravine where they had been first placed, quite out of sight from the picture above, concealing all the unavoidable and ungainly-looking objects of a saw-mill yard."

With these extracts we dismiss 'Wyandotté,' recommending it to the favourable consideration of our readers.

OUR LIBRARY TABLE.

Cowper's English Version of the Odyssey of Homer: with a Commentary in Explanation of the practical Purposes of the Text, by OY TIΣ, F.R.S., &c.—The noticeable thing in this neat edition is the running commentary on the "mystic sense" of the Poem. Therein if he have but faith, the reader will find much curious information. Homer, it seems, should take rank "among the prophets"; for in his capacity of prophet he foresaw all the evils of modern society—and these he has foreshadowed, not dimly or in vague generalities, but with minute particularity. Thus Proteus represents a smuggler, "hanging out the flags of all nations by turns, rather than fail of his object": Menelaus is "the chancellor of the University of Argos," making his interest and power "the introduction to an easy and tranquil old age in retirement"; and so on. This tendency to particularize is shown most clearly in the interpretation of the allegory of Scylla and Charybdis. With regard to Scylla the editor is rather in doubt. "It *may* be the *press-gang*, formerly the mariner's greatest and most flagrant grievance; it may be the practices of crimps, and fraudulent dealers of various classes, on his newly replenished purse; it may be even the police of a seaport; but there are features in the picture which agree strictly with none of these. It *may* be, lastly, in irony, that very harmless place of resort (provided a man have money in his pocket to pay withal), the cook's shop! But the name of Crataïs (*krataiis*, vis magna) seems to assign to the government the origin of the pest; from the operation of which the hero is here advised to secure his men by a 'protection.'" As to Charybdis, with its ebb and flow thrice a day, there can be no mistake: it is the pawnbroker's shop, wherein "thrice a day (it should seem in that age) they let in the poor to pawn their property and thrice to redeem." Did we not think this sufficient, we could inform our readers how that the Sirens represent balls and concerts to which the superior officers give themselves a dispensation to go, while "the hands" and all on duty are expected to stay on board; we could show them how that a gold cup "perhaps made by Tubal Cain" came into the possession of Phœdimus, "if Phœdimus be Solomon," together with other equally probable suppositions. The scholar, too, may gain from this commentary much information on etymology.

A Statement of Facts in relation to the recent Ordination in St. Stephen's Church, New York, by Drs. Smith and Anthon.—It would seem from this pamphlet that Puseyism is spreading in America, as according to the statements here made, the Rt. Rev. Dr. Onderdonk, Bishop of New York, with six presbyters, consented to the ordination of a Mr. Carey in spite of the remonstrances of Drs. Smith and Anthon, the remaining two of the college of presbyters, who accuse the candidate for ordination of holding Romanist principles, decidedly opposed to those of the Protestant Episcopal Church of America. Beyond this statement of facts we have, of course, nothing to do with the question.

A Glossary to 'By-gone Hours,' by Dry Nurse.—A poet here protests against the injustice of the critics toward a brother poet,—the author of 'By-gone Hours.' The Glossary opens with an imaginary dialogue between the poets, in which 'By-gone Hours' consoles himself that—

> Future generations
> Shall honour, with applauses loud and long,
> The poet's genius, and the child of song.

To which Dry Nurse replies:—

> Such thoughts are very pleasant,
> I only wish they'd praise you more at present.

With a self-devotion worthy of admiration, Dry Nurse adds some "Imitations" of his friend's Epigrams, by the inferiority of which to those of the "great original" he hopes, we suppose, to impress the reader with an idea of the terseness and pathos of the elder poet. Thus, says By-gone Hours:

> The short-lived Rose, before to-morrow's dawn,
> Bereaved of bloom, scarce differs from a thorn.

Thus imitated:—

> The grass that I saw in the meadow to-day,
> When it's cut down, will scarce differ from hay!
> And true it is, if you're out when it rains,
> All that you get, is—wet through for your pains.

Again:—

> The strictly honest, and the truly brave,
> Despise alike the treacherous knave.

Now, *haud passibus æquis*, Dry Nurse:—

> An honest man and a naughty thief
> Are not alike, it's my belief.

As our judgment has been appealed from, we leave the question as desired to "future generations."

Gleanings from the South, East, and West—consists of a tale entitled 'The Huguenot Family,' the scene of which is partly laid in South Africa,—'The Cingalese Converts,' a story whose title conveys a sufficient description of its localities,—and 'The Two Bridals,' a West Indian romance. They are compounded of good feeling and commonplace in about equal quantities.

Aunt Martha; or the Spinster.—The title of one of Miss Mitford's prettiest sketches is here prefixed to a small romance of some sixty pages; good neither for old nor young, and beneath the average of Annual fiction.

The Character of the Rev. W. Palmer as a Controversialist considered, in a Letter to a Friend at Oxford.—Here we have Greek meeting Greek, Roman Catholic meeting Anglo Catholic, on the very debateable ground of the Fathers. For our parts we believe that "both are right and both are wrong"; the Fathers, with admirable impartiality, having written on one side as much as on the other. Had poor Vincent of Lirens imagined what a sensation his unfortunate canon would make, we doubt whether he would have bequeathed such a bone of contention to posterity.

The Philosophy of Training, by A. R. Craig.—This little work contains some sound remarks, mixed, as usual in books of the kind, with many fallacies. The author thinks it necessary to attack the systems and discipline of the Cam and Isis, regarding which he seems wholly ignorant. What can he mean by the copies of Greek Pentameters written at Oxford, as qualifications for "prizers"? There are legitimate causes enough of complaint against our Universities; why invent others?

A Voice from the Holy Land, edited by Rev. E. Mangin, M.A.—A little work, in the style of the Athenian Letters; purporting to be the letters of a centurion in Judea, at the time of the preaching and death of the Messiah, to a friend at Rome. The letters are unobjectionable, but wanting in originality and power.

Canada, Nova Scotia, &c., in regard to Emigration. A useful little manual for emigrants, but, like most works of the kind, it does not enter sufficiently into particulars.

The New Torquay Guide, by Democritus Tertius.—Democritus Tertius is no Anstey *redivivus*, though he uses the slipshod rhyme of 'The New Bath Guide,' with fluent and feeble pleasantry, to describe the beauties of one of the fairest haunts of the West Country. The quiz on Dr. Granville, who, it will be recollected, gave "scrimp measure" of praise to Torquay, is the most pungent portion of his *brochure*.

Jerusalem as it was, and as it is, translated from the German, by Sophia Taylor.—A neat little abridgment of the larger works of Raumer, Schubert, Robinson, Fisk, &c. It might have been extended with advantage, but, brief as it is, it forms an interesting volume. The translation has been executed with judgment.

The Ottoman and Spanish Empires in the Sixteenth and Seventeenth Centuries. The History of the Popes in the Sixteenth and Seventeenth Centuries, by Leopold Ranke: translated by W. K. Kelly.—These two works together form the four volumes of the original German edition called collectively, 'Sovereigns and Nations of Southern Europe in the Sixteenth and Seventeenth Centuries.' No doubt can be entertained as to Ranke's merits as a historian, and he appears, on a hasty glance, to have been faithfully rendered by Mr. Kelly.

A Synopsis of the various Administrations for the Government of England from the Year 1756 *to* 1842. —Had this Synopsis been contained in an octavo instead of a large folio volume it might have been useful.

A Tabular View of the Classification of Organised Bodies, arranged by W. B. Tegetmeier.—This table is arranged according to Cuvier and Decandolle.

List of New Books.—Parkinson's (Rev. R.) The Old Church Clock, 12mo. 2*s.* 6*d.* cl.—Wyandotté, or the Hutted Knoll, by J. Fenimore Cooper, Esq., 3 vols. post 8vo. 31*s.* 6*d.* bds.—The Attaché, or Sam Slick in England, 2nd edit. 2 vols post 8vo. 21*s.* cl.—Rose's New Biographical Dictionary, Vol. V., 8vo. 18*s.* cl.—London, by C. Knight, Vol. V., imperial 8vo. 10*s.* 6*d.* cl.—Durandus (Bishop) on the Symbolism of Churches and Church Ornaments, translated with Notes, &c., by Rev. J. M. Neale, and Rev. B. Webb, post 8vo. 10*s.* 6*d.* cl.—History of our Blessed Lord, with 13 coloured pictures, square, 4*s.* 6*d.* bds.—The Three Questions, What am I? Whence came I? and Whither do I go? 12mo. 2*s.* 6*d.* cl.—China, its Scenery, Architecture, and Social Habits, &c., Vol. I., 4to. 21*s.* cl. elegant.—The Book of Precedents, by S. H. Gael, 12mo. 10*s.* cl. 13*s.* calf.—Dr. Ashe's Masonic Manual, or Lectures on Freemasonry, with Remarks, &c., by Rev. G. Oliver, 12mo. 7*s.* 6*d.* cl.—Tragedies, by Serjeant T. N. Talfourd, 8vo. 6*s.* cl.—Carpenter's Popular Cyclopædia, 'Animal Physiology,' Part II., 12mo. 5*s.* swd.—Eight Sermons, by Rev. Robert Montgomery, 8vo. 10*s.* 6*d.*

OUR WEEKLY GOSSIP.

It is with deep regret that we announce the death of Sir T. Charles Morgan—one of the best men it was ever our good fortune to be associated with, either in public or private life. We dare not, at this moment, trust ourselves to speak of him as our heart dictates. What would seem extravagant eulogy to those who knew him not, or knew him only under the chilling influences of general society, would but imperfectly express our feeling, and be read but as a poor and unworthy testimony to his virtues by those who had the honour and the happiness of an intimate acquaintance with him. He was a man of a refined and philosophic mind, and varied accomplishments—a scholar and a gentleman in the largest sense of those comprehensive words. Though essentially a social man, he was not, in our opinion, especially qualified to shine in society. He recognized, indeed, and at its full value, the graceful ease of manners and opinion which best enables men to glide smoothly through life; but he would rather commend than imitate it; though tolerant of all differences, he was too honest to trifle with truth, and too earnest to smooth and polish it down to that true no-meaning which is the current coin of conversation in our day,—an indignant or a generous impulse was sure to break through conventional usage. In his family, or among friends whom he loved and trusted, he was simple and gentle as a child—always cheerful, always ready for a laugh or a joke, with an anecdote or a pun—no matter what, so it made those around him happy. He was open to all generous and genial influences, and sensitive as a woman to the feelings of others; nothing was insignificant that enabled him to give pleasure. We are personally indebted to him for so many acts of kindness and consideration, that we feel, at this moment, "poor even in thanks."—To come to those barren facts which are expected in the briefest of obituary notices: Sir Charles Morgan was the son of John Morgan, Esq., for many years resident in Charlotte Street, Bloomsbury. He was sent when very young to Eton, but removed to the Charterhouse. He entered at Cambridge in his eighteenth year, and was distinguished there as a Greek scholar; and, as we have heard his contemporaries say, for his uncompromising opinions, and the power and metaphysical acuteness with which he maintained them. There, in due course, he took his Doctor's degree, and soon after married the daughter of Mr. Hammond, of the Stock Exchange. On the death of this lady, by whom he had one daughter, he accompanied the late Marquis of Abercorn to Ireland, and there married Miss Owenson, and settled in Dublin. Embracing with all the earnestness of his nature the cause of his adopted country, he contributed his time and talent, in joint labour with his wife, to promote its interests, and, above all things, Catholic Emancipation. Besides those chapters on Science, Politics, and Statistics, which he added to Lady Morgan's 'France' and 'Italy,' he published 'The Philosophy of Life,' and 'The Philosophy of Morals,' works which drew down upon him, in those days of triumphant assumptions, the persecution of opinion—

Far worse to bear
Than violence—

but which he bore, with all its consequences, cheerfully, for it was, as he believed, in the cause of truth. It was some consolation to know that these works were welcomed on the continent, and translated into French, under the supervision of the Count de Tracy, one of the most distinguished metaphysicians of his age and country. In 1837, a desire for the best medical advice, in consequence of Lady Morgan's threatened loss of sight and declining health, with circumstances of a private nature, induced him to return to and settle in London. He wrote other works—amongst them we remember 'The Mohawks,' a satirical poem, with notes—and was for many years a contributor to one or other of the more distinguished periodicals.—But we must conclude this hurried notice. We have not attempted a biography—the cloud that overshadows us must pass away before we venture to recal the thousand circumstances that won for him our regard—and ere then we hope some abler pen will do justice to his memory.

As the reader may suppose, we are in no humour for trifling, and shall therefore allow more licence than usual to a correspondent. "If you care for a bit of gossip architectural, the late doings at Wisbeach, on the occasion of laying the first stone of a small cemetery chapel, might be referred to as of an extraordinary character, it having been made—not very decorously, perhaps—the pretext for protracted festivities during several days. In addition to the attraction of a Fancy Bazaar, there was a Concert and Ball, a Picture Exhibition, and also an Exhibition of Fireworks! which last alone, it is said, must have cost at least 40*l.*, to say nothing of the expense incurred by profuse hospitality—keeping open house for guests of distinction during the whole week—so that the party might as well have undertaken to build the chapel at his own sole cost, for I understand that it will not much exceed 400*l.* There is another circumstance connected with the business, which is likely, I think, to give umbrage to the architectural profession, namely, that Mr. Basevi (one of the Vice-Presidents of the Institute,) acts as architect *under* Prof. Willis, who has given the design for the structure; nor is this matter of doubtful report, it being thus recorded on the foundation stone:—

"Professor Willis, F.R.S., *delt.*
Geo. Basevi, jun. Esq. *archt.*"

Whether Mr. Basevi will be censured by his brother architects for accepting the office of Clerk of the Works to the Professor, remains to be seen. Had it been a matter of mere private arrangement between the parties, I know not that the profession ought to have taken notice of it, but such kind of association seems to portend a change in professional position. To be sure Prof. Willis has a name and fame, and is a scholar; but then we find Prof. Hosking engaged at St. Mary Redcliff as *aide* or *sub* to Mr. Britton! At present such co-partnerships may be matters of arrangement and choice, but these strange examples may not be lost on the public, and the time may arrive when they will be insisted upon. Nor is it the least remarkable thing, that in both the cases above-mentioned the non-professional man formally takes precedence of the professional."

Had every great medieval painter had as many hands as Briareus, and a pencil in each, he could not have painted half the old pictures daily discovered and affiliated upon him. One would think the dust of lumber-rooms bred these productions like vermin, and that it was only requisite to poke into some receptacle for rubbish, to be sure of turning up a jewel! An undoubted 'Virgin,' by Correggio, accidentally met with at the Seven Dials—a 'Belle Jardinière,' the real original by Raffael, just brought to light at Newington Butts—Titian's 'Venus,' of which that in the Grand Duke's collection is a palpable copy, rescued from its obscure and dangerous situation as sign of the Victoria public-house, Clerkenwell—Michaelangelo's 'Cupid pursuing a butterfly,' long the chief ornament of a celebrated Brentford connoisseur's cabinet: such are the mare's eggs hatched dozen after dozen, which the finders imagine those of a phœnix! Here is Annibale Carracci's '*Andromeda*,' till now quite an unknown work by that master, come all the way from Derbyshire to the Cosmorama, Regent Street, for metropolitan admiration. Many critics indeed, foreign as well as native, the prospectus declares, ascribe it "with equal confidence" to Titian, Domenichino, and Guido; so do we, ascribing it with not a whit more confidence to one of them rather than another. Their beauties apart, it cannot boast even their defects, neither Titian's bad draughtsmanship, nor Carracci's coarseness, nor Domenichino's dull elaboration, nor Guido's morbid sentiment, but exhibits all these faults in a worse style of its own; its greatest merits do not rise to the level of their imperfections. Yet we dare say it will make the grand tour of these kingdoms, and be proclaimed at sound of penny trumpet by the newspaper critics wherever it goes—a miracle!—with full as much justice, too, as many another one—some "Old Master" gross and grimy enough to pass for a specimen of the great Italian style, or some modern daub, whose importunate glare and flare is taken for undeniable splendour, overpowering magnificence. Public taste has little improved as yet, despite all our travelled dilettantes, all our visitors of Galleries, Museums and Collections, continental and national: year after year are pictures or sculptures exhibited in this show-room, or that, where the real show is the flock of gulls opposite them. Could the groan, which "escapes from Andromeda's finely formed mouth" (*vide* prospectus) be heard, we surmise it would be a groan for her admirers, not herself: the Sea-monster, a "huge, disgusting reptile, with glowing eyes and opened jaws," seems to utter an immense O! of amazement, which, perhaps, may mean, turned into plain English—"All the fens of Lincolnshire could not furnish greater geese, than stretch out their necks and clap their wings in canorous cackle at my charms and self-congratulation at their perception of them! *Tant mieux*—they will depart well pleased, and well plucked." Verily popular connoisseurship has made no vast advance since the time when President West's 'Christ Rejected' went circuit through both England and North America, gathering golden tributes and leaden opinions from saint, from savage, and from sage, all the way between London Stone and the Blue Mountains. Another of these itinerant exhibitions was a pair of 'Adam and Eve' scenes, by *M. Dubufe*, which combined the bad qualities of both the French and British schools, so united the public voices of France, Great Britain, and Ireland in its favour. Various examples besides crowd upon our memory for quotation; but let these suffice. We have made poor 'Andromeda' an occasion to moralize a little about popular taste, though its proprietor appears no more impressed with a sense of its perfection, than the lady or the Monster. He professes himself only anxious that its just pretensions should be ascertained by the critics, and we have contributed our mite towards promoting this most legitimate object.

The question which Mr. Hawes lately propounded to Sir Robert Peel respecting the public recognition of the labours of eminent civilians (see *Athen.* p. 756), appears, from the subjoined letter, addressed by the Premier to Mr. Eastlake, as Secretary of the Commissioners on the Fine Arts, to be likely to lead to some practical results:—

Whitehall, August 17, 1843.

Dear Sir,—A proposal was recently made in the House of Commons, that the Commissioners should be empowered by Her Majesty to inquire into the best means of doing honour, by public monuments in sculpture or painting, to be erected at the public charge, to the memory of men entitled to the gratitude of their country by eminent civil, literary, or scientific services. I was unwilling to devolve on the Commissioners a general inquiry of this nature, not immediately connected with the original object for which the Commission was appointed, but I willingly undertook to recommend to Her Majesty to give to the Commissioners full authority to consider whether there is any portion of the edifice intended for the accommodation of the Houses of Parliament or of the buildings connected with that edifice, which could, with advantage and propriety be allotted to the reception of monuments, such as those to which I have before adverted, and to report their opinion to Her Majesty, not only with regard to the particular site of such monuments, but in the event of an appropriate site in connexion with the new Houses of Parliament being recommended by the Commissioners, with regard to the principles, generally, which should govern the selection of the names to be honoured by so distinguished a record of national gratitude, and to the best mode of combining the public acknowledgment of eminent service with encouragement to the arts in this country. I am empowered by Her Majesty to recommend the subject to the consideration of the Commissioners, and to give them Her Majesty's full authority for entering upon it. I am, &c. (Signed)

C. L. Eastlake, Esq. Robert Peel.

A correspondent of *The Times*, writing from Canada, questions the policy of extending the law of copyright to the colonies. The price (he says) of books printed in Great Britain and carried to the colonies is so high, that it amounts to a prohibition; and this is not only a serious impediment in the way of civilization, but debars the colonists from procuring even those works which would be of immediate practical utility to him; and so well (he tells us) are the English booksellers aware of this, that they seldom or ever send out more than half a dozen copies of a new work. Why, what is there in this argument that does not apply equally well to Connaught, or Munster, or Fife, or Forfarshire? No doubt the high price of books is an impediment in the way of civilization, and the remedy is to remove the tax on paper, &c. &c., and all other taxes that tend to raise the price. Books would help forward civilization in England, Ireland, and Scotland, as well as in Canada: they have a "direct practical utility" in Wales as well as in Ottawa County or Trois Rivières; and are the Welsh farmers or the Irish cotters better able to pay for them than the Canadians? The argument, therefore, so far as it is general, is of universal application, and so far as it is special, is without force. The booksellers of Great Britain, we are told, send but half a dozen copies. Why? because if heretofore those copies did not reach Canada by express, the market was forestalled by the American reprints; but we will answer for it, that if an enterprising Canadian bookseller will enter into a treaty with the London publishers, he may have five hundred or five thousand copies of any work expressly printed for his market, at some twenty or five and twenty per cent. above the mere cost of paper and press-work; and he may thus help forward colonial civilization, and put works of practical utility within the reach of the colonist, at a price at which it is impossible to offer them to our own countrymen. This is the natural and obvious remedy of the inconvenience of which the writer complains, and will certainly be adopted; but no doubt the market has not yet adapted itself to the altered circumstances, and books are and must be dear, until the new channel is freely opened.—Already, and since the above was in type, we have received from Mr. Murray, the announcement of a series, to be called "The Colonial Library," expressly projected to meet the difficulties urged by the Canadian, and in which it is proposed to furnish the colonists with useful and popular works at the lowest possible price.

Private letters from Jiddah, on the Red Sea, mention that an Englishman, Mr. Mansfield Parkyns, late of Trinity College, Cambridge, is making preparations to ascend the White Nile, penetrate the Galla country, and strike across the continent to the Niger! Our correspondent says, Mr. Parkyns is a high-spirited young man, and has been some time travelling in Asia Minor.—A letter from Constantinople states, that "The impression is every day gaining ground at this place, that the report of the murder of Colonel Stoddart and Captain Conolly, at Bokhara, is altogether unfounded in fact. All the Hajjis who pass through Constantinople, on their way to Mecca, agree in contradicting this story, and state that, though incarcerated, these gentlemen are still alive." Surely the government must take some active and effective means to set this question at rest.

We learn, from the *Doncaster Chronicle* that the workmen employed in cleaning and repairing the parish church in that town, have discovered upon the walls some highly curious and interesting paintings in fresco [?], which had become almost obliterated by dirt and the hand of time. The design is, it is said, extremely rude, and the figures are drawn in a hard and Gothic style; are about four feet in height, and each distinctly defined by a broad black outline. Such, in fact, is the general character of the painting, that there would seem to be little doubt that it is of a remote date; if, indeed, it is not coeval with the church itself. The date of the erection is not accurately known, but it is conjectured to have been in the reign of Edward IV., about the close of the fifteenth century. Mr. Alport, artist, of Rotherham, is engaged in making a drawing of the picture above described, with a view to the publication of a lithographic plate.

VENICE.—MORNING and EVENING EXHIBITION.—Under the patronage of the Emperor and Empress of Austria, the Kings and Queens of Prussia, Bavaria, and Holland (whose signatures may be seen in the Royal Album, in the Exhibition Room).—The Grand MODEL of the CITY of VENICE (with brilliant effect of sunshine, produced by artificial light), representing every object in the City.—Open to the public, at the Egyptian Hall, Piccadilly, from eleven in the Morning till Ten in the Evening.—Admission, 1*s*.

DIORAMA, REGENT'S PARK.

NOW OPEN, with a NEW EXHIBITION, representing the CATHEDRAL of NOTRE DAME at Paris, with effects of Sunset and Moonlight, painted by M. REMOUX, and the BASILICA of ST. PAUL, near Rome, before and after its destruction by Fire, painted by M. BOUTON. Open from Ten till Six.—N.B. A GRAND MACHINE ORGAN has been constructed expressly for this Exhibition, by Messrs. Gray and Davison, of the New-road, and will perform the Gloria, from Haydn's Service, No. 1, during the midnight effect of the Cathedral of Notre Dame.

MEETINGS FOR THE ENSUING WEEK.

TUES. Horticultural Society, 3, P.M.
THUR. Zoological Society, 3.—General Business.

MUSIC AND THE DRAMA

HAYMARKET.—'The Wedding Breakfast' is only noticeable as a specimen of that sort of mechanical drollery which is the staple of pantomimic fun, and exerts such triste influence over the gambols of the motley crew. It is a farce, made up of practical jokes, of the most approved kind on the stage, we conclude, because they are constantly employed to produce bustle, in the absence of anything lively or natural in the dialogue or the characters; but which reduce the actors to the condition of grimacing machines. Of humour, it has not a particle; and the incidents are not merely absurd in their improbability, but disagreeable withal. Mr. Farren plays an elderly Doctor, who is horrified at the expense of the "wedding breakfast," which the "managing mamma" of his young bride-elect is ordering at his cost; and whose discomfiture is complete at hearing from the lips of the young lady herself that she hates him and loves a man whom she has corresponded with, but never seen, having only had a squeeze of his hand "in the dark, in Kensington Gardens." Of course, the lover enters the next minute, and turns out to be an adventurer, who is going to marry a rich widow, whom he hates, to save himself from jail; but, instead of the young couple running off together, as usual, the respective parties pair off; the old Doctor making his young bride believe that he was her unseen admirer, and exposing the baseness of his rival, whom he had unwittingly introduced to his intended wife. To us, there is no more of drollery than of novelty in all this; though one or two of the situations are ludicrous, apart from their outrageous improbability; but this kind of humourless fun, which is made at the expense of the *dramatis personæ*, and also of the performers who fill the parts, is of an unpleasant kind,—and, like a practical joke in real life, is only perpetrated or enjoyed by such as are incapable of any more genial amusement. It was painful to see such an actor as Mr. Farren lending himself to be the laughing-stock of a piece which afforded scope only for those grimaces that he practises too constantly. The end of a farce, it may be said, is accomplished if it makes people laugh: this the author and actor managed between them, though the merriment was neither universal nor cordial.

MISCELLANEA

Paris Academy of Sciences.—Aug. 14.—The notes read or reported upon were chiefly on matters of abstruse science, possessing a very limited interest.—A paper was received from M. Dutrochet, on the production and ripening of fruits. This gentleman confirms, by his experiments, the modern opinion that the removal of the leaves of fruit-trees, in order to expose the fruit to the direct influence of the air and light, is exceedingly destructive; but he considers it highly essential that the tree itself should be well exposed to both. This is particularly requisite with the dwarf vine, which if shaded, or placed in a position which prevents its receiving an abundant supply of air, becomes almost unproductive.—The same gentleman communicated a paper on some enormous hailstones picked up on the 10th inst., near Villers-Cotterets. They were from one to two inches in diameter generally, but some were as large as a hen's egg. Their form was an irregular half-sphere. In the centre was a nucleus of opaque ice, over which was a covering of transparent ice, and this was repeated four times, the covering of each opaque body always transparent.—A paper on lightning, and its action on sand, was communicated by Dr. Fiedler. It is a general opinion at Paderborn, in Westphalia, that wherever a thunderbolt falls vitrified tubes are to be found. In 1711, the Rev. Mr. Hermann, at Massel, Silesia, followed these tubes to a considerable depth in sandy hillocks, the description of which is to be found in his 'Mastography,' under the denomination of fossil shrubs or osteocolla. He thought that these tubes were formed in the earth, and came gradually up to the surface. Other persons have considered them to be petrified roots. M. Couerden dug one up at the depth of 15 feet. In 1812, Mr. Irton, of Irton Hall, dug one up. Dr. Fiedler has seen them in Hungary, and at Harz, near Dresden. They have been found on the border of the desert of Sahara, in the Brazils, &c. M. A. de Humboldt sent to Dr. Fiedler a piece of porphyry which he broke from off one of the highest mountains of the chain of the Andes, and which contained a portion of a tube. On the 13th June, 1841, at 5 p.m., during a violent thunder-storm, a bolt fell on the right bank of the Elbe, near the village of Loschwitz, a league from Dresden, split a stake, burnt the leaves of a plum-tree, and buried itself in the earth at an angle of 66°. On digging a hollow tube was found, in which the sand was completely vitrified; it was simple for about four feet, and then divided itself into two branches, which disappeared on reaching a sandy, argillaceous, and ferruginous soil, containing a great deal of water. The electric fluid, on meeting several roots, went round them, simply blackening without destroying them.—*Aug.* 21.—The following communication from the Governor of Guadaloupe was laid before the Academy: The earth has not ceased to quake, particularly at Grande Terre and Point-à-Pitre, since the 8th of February; but since the 24th of April the shocks, with the exception of a pretty sharp one on the 4th of May, have become more slight as well as more rare, and we were beginning to think we were at the end of the phenomenon, when on the morning of May 4, an alarm was excited by new convulsions of the earth. The first shock took place at about half-past five; it was severe, and lasted from 3 to 4 seconds. At about six o'clock a second shock took place, which lasted 8 to 9 seconds. According to the general opinion, it was the most severe that we have had since the catastrophe of February 8. I compare it with the shocks tha we felt at Basse-Terre on that fatal day, and I find that my furniture here has been as much tossed about as it was in my cabinet at the moment when the district of the Champ d'Arbaud was the most violently agitated. I know nothing yet from Basse-Terre or the country, but here in the midst of our ruins, we saw a great number of the fragments of our walls fall, and our population in affright, rushing to the public squares, in apprehension of a new disaster.—A paper was received from M. Delaunay, announcing his intention of making a series of minute investigations connected with the tides. He states that it was, in the first instance, necessary to determine whether the tides of the Atlantic are produced in a direct manner by the action of the moon and sun, or whether, as asserted recently in England, they proceed from the motion of the waters of the South Seas. M. Delaunay states, as the result of his investigations, that the tides of the Atlantic are to be attributed to the action of the sun and moon.—M. Flourens read a paper on the comparative structure of the skin in various portions of the human race. In the year 1836, M. Flourens published the results of his first investigations as to the comparative structure of the skin in three distinct races, the white, black, and red, or American. Since then he has received from Algiers portions of skin, skulls, and entire heads of Arabs, Moors, Negroes, &c., and he reports that they are all essentially and fundamentally the same.

Progress of Lotteries.—Excursion.—A model of a Ship, &c., will be disposed of by Lottery on board, among the purchasers of Tickets for the Excursion. Tickets, with a share in the Lottery, 3*s*. 6*d*.

Four magnificent and richly wrought silver tea services, with coffee pots, now exhibiting at the —— Rooms, Corn Exchange, Cork, will be raffled for the two following days after the exhibition, Friday the 25th, and Saturday the 26th, of August, &c.

The following curious epitaph may be seen in the churchyard at Folkestone:—

In memory of Rebecca Rogers,
who died August, 22, 1688, aged 44 years.
A house she hath, it's made of such good fashion,
The tenant ne'er shall pay for reparation;
Nor will her landlord ever raise her rent,
Or turn her out for non-payment:
From chimney-money, too, this cell is free,
To such a house who would not tenant be?

THIRTEENTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[*From our own Correspondents.*]

FRIDAY, AUGUST 18.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Mr. S. HARRIS laid before the Physical Section the results of the discussion of the Meteorological Observations made at Plymouth and Devonport at the request of the Association. The great mass of the results which these observations necessarily involved, had precluded the possibility of completing a full report, such as would be requisite for the pages of the next volume of the Association. The requisite documents are, however, sufficiently complete to insure this report for the next meeting. The first series of observations were those deduced from Mr. Whewell's Anemometer, by which a result has been arrived at not dissimilar from that laid before the meeting at Manchester, viz. the existence of a sort of trade-wind, or current of air, from south to north, in the place where these observations were made. This was exemplified by large typographical delineations of the aerial currents, by lines proportional to the velocity and direction for given times, laid down for the years 1841 and 1842. Mr. Harris made some observations on the nature and capabilities of this instrument, and the results which might be expected from it, in deducing the great annual movement of the atmosphere. The result of the discussion of the observations with Osler's Anemometer were next brought under consideration, which being regularly tabulated and discussed, had shown a mean hourly intensity of the wind, tending to follow an order similar, but inverse, to that of the barometer; a major and minor wave occurring in the day, so as to produce two maxima and two minima of intensity, the full discussion of these observations had not yet been effected to a sufficient extent to exhibit all the various relations of the wind required. The remaining observations on pressure and temperature were next considered; and graphical delineations of the mean hourly progress of the temperature, pressure, dew-point, and intensity of the wind, were brought under one point of view in a general diagram.

The Rev. Dr. SCORESBY inquired from Mr. Harris how the mean lines, which appeared to be the final result of the observations with the anemometers, were obtained?—Mr. Harris replied, that these were merely laid down by the eye, that no deduction was grounded upon them, and that they were placed there merely to give the Section a general idea of the mean direction of the great aerial current which passed annually over Plymouth.—Dr. Scoresby suggested, that a mean result might, as he conceived, be very readily and accurately obtained, by laying down each day's work of the machine, something after the manner in which traverse sailing was worked by the masters of ships at sea. To this Mr. Harris assented. Dr. Scoresby stated, that so invariable were the relations existing between the temperature, pressure, the direction of the wind, and the general state of the weather in the Polar Seas, that when he sailed in them he found he could almost with unerring certainty, predict the changes of wind, from north to south and *vice versâ*. He had kept a record of these anticipations for thirty-two days, and twenty-nine of those turned out to be correct.—Mr. BEAMISH said, that the general result of the anemometer, obtained by Mr. Harris at Plymouth, seemed to indicate an atmospheric current tending towards the west; now this was opposed to a most familiar fact in the county of Cork, namely, that all the trees, particularly near the coast, had a leaning towards the east; indeed, it was well known that the prevailing winds here were westerly.—Mr. Harris replied, that the long continuance of a particular wind did not at all prove that the total atmospheric current set from that quarter; for a single day's violent blowing of a storm from the opposite quarter might be more than sufficient to counterbalance the long continued, but more gentle effect.

Prof. LLOYD availed himself of the opportunity afforded by the present discussion, to read an extract of a letter which he had that morning received from Mr. Osler, describing various improvements which he had recently made in the construction of his anemometer. These improvements consisted, chiefly, in a modification in the form of the vane, whereby its arc of oscillation was reduced in magnitude, and in the dimensions of the pressure plate, by which its indications were rendered more sensible. The writer stated, that he felt much confidence in the performance of his instrument in its present improved form.

'On the Nature and Causes of the Diurnal Oscillations of the Barometer,' by G. Hutchison.—In the first part of this paper the author, after stating the leading features of the phenomenon, argued, that the three explanatory suggestions previously advanced relative to its cause, viz. diurnal variations of temperature, diurnal variations in the amount of moisture in the atmosphere, and diurnal variations in the force of the wind, whatever influence they might separately and conjointly have in modifying the extent of the atmospheric tides and the periods when their maxima and minima are attained, were totally inadequate to account for the broad features of the phenomenon, as exhibited in intertropical climates. The author then ascribed the phenomenon of diurnal atmospheric tides to the ever-varying degrees in which the rotatory and orbital movements act, either in union with, or in opposition to, each other in different latitudes during the course of twenty-four hours, and the different seasons of the year. During night, when the orbital and rotatory movements co-operate more or less in direction, the excess of acquired velocity, through space in the orbital direction above the mean of 68,000 miles an hour, must communicate some degree of lateral pressure to the atmosphere in the direction of rotation. On the contrary, during day, when the orbital and rotatory movements act more or less in opposition to each other, the atmosphere must be subject to an equal amount of lateral pressure in the opposite direction of rotation. But when the atmosphere was moving in the orbital direction, with its mean velocity of 68,000 miles an hour, which occurred only at 6 o'clock A.M. and P.M., no lateral pressure could thence result, for the rotatory and orbital movements of the atmosphere, through space, were then equal to, and therefore nullified, or neutralized, its acquired velocity. The theory advanced is also supported by the results obtained from laborious reductions of long-continued observations made in different places, in temperate latitudes, by different philosophers. From these it appears, that even in temperate latitudes the atmospheric tides attain two maxima and two minima annually, the former occurring during spring and autumn, the latter during summer and winter. This, on the supposition of the theory being true, is exactly what ought to take place. In consequence of the rotatory and orbital movements coinciding more directly during night, and being more directly opposed to each other during day, at the equinoxes than at other seasons, it is in accordance with the theory under consideration, that the atmospheric tides should attain their maxima about these periods of the year; and upon the same principle, in consequence of the greater divergence of these forces from exact co-operation with, or opposition to, each other at the summer and winter solstices, than at other seasons, it is also in accordance with our theory, that the atmospheric tides should attain their maxima about these periods of the year.

Mr. HARRIS inquired, whether the theory laid down by Mr. Hutchison would explain the atmospheric tides in the upper regions of the atmosphere, which were well known to be directly opposite to those lower down, as, for example, those observed and recorded at the Great St. Bernard by Mr. Forbes.—Mr. HUTCHISON answered, that they were explained by the theory he had advanced, and that the facts observed by Mr. Forbes at the Great St. Bernard were among those which he had quoted as proofs of the soundness of the explanation he had ventured to give.—Mr. Harris did not see how the fact, that the hourly oscillations of the barometer, observed at lower latitudes, become negative at higher latitudes, could by any possibility be accounted for by Mr. Hutchison's theory.—Mr. Hutchison admitted, that he could not account for them, and that they constituted the only real difficulty he had met with in explaining by his theory the observed facts.

Mr. NOTT, 'On a new Electrical Machine, and upon the Electricity of the Atmosphere.'—This paper treated at great length of electrical currents and of the atmospheric electricity, by way of a preliminary to the consideration of terrestrial magnetism. The author insisted on the close analogy between the voltaic pile and a magnet. The difference between voltaic and frictional electricity he conceives to be, that the former is *in* the conducting wire, the latter *on* its surface, and therefore decomposed by whatever approaches it. Besides, the voltaic pile exhibits the two electricities and the current in which they unite; whereas the ordinary frictional machines develope and maintain but one electricity and no current. Among the novelties presented by the paper, may be mentioned the description of what the author calls the rheo-electric machine, in which both electricities are developed by friction. "It consists of a circular plate of glass and another of resin, both supported upon a horizontal axis, and set in motion by a winch handle; the rubber of the vitreous plate is connected by a metal rod with the rubber of the resinous one; and the conductor of the latter plate is also connected by a metal rod with that of the former, and thus a complete circuit is formed, as in the voltaic pile. The distribution of the electricity of this instrument is also analogous to that of the pile. For example, the electro-motive disturbance is produced by the plates; the rubber of the vitreous plate is rendered negative, that of the resinous one positive; and the conductors are also in opposite electric states, and their remote extremities are therefore analogous to the poles of the pile. When the conductors are connected by a conjunctive wire, it is natural to suppose that the accumulated electricities flow along its surface in opposite directions, for then an electric current is formed, which permanently deflects the magnetic needle, and the deflection is according to the direction of the current. The direction of motion of this current may be varied at pleasure; for instance, in order to fix our ideas, let us suppose the plates of this instrument and the axis of the conductors to be lying in parallel planes, perpendicular to what is called the magnetic meridian, the conjunctive wire connecting the conductors being bent at right angles, a portion of it will then be in the meridian, and the metal rod connecting the rubbers will be parallel to this portion. If now a magnetic needle be suspended above the conjunctive wire, and the resinous plate, which we will suppose to be placed north of the vitreous one, be connected with the earth, then a current of electricity passes from the resinous plate, and consequently flows along the conjunctive wire from north to south; the needle is then permanently deflected towards the west. If the needle be placed beneath the conjunctive wire, the deflexion is towards the east. When the vitreous plate is connected with the earth, the current flows from the vitreous plate, and the deflexions are in the opposite directions." In the course of his experiments with this machine, the author found that all the parts of it which were made of brass became, by electrization, highly magnetic, and retained their magnetism for some time. The character of the magnetism thus produced will be understood by conceiving an orthographical projection of this instrument, to be drawn upon a horizontal plane: it will be a parallelogram, of which the conjunctive wire will form one side, and the rod connecting the rubbers another: then all the brass parts of one half of this parallelogram, cut off by a diagonal line, will attract the north pole, and all of the other half the south pole. But if immediately after electrization, either pole of the needle be forced into contact with any part of the brass conjunctive wire, it will develope an opposite magnetism to its own, and adhere to the wire, as it would to a piece of iron. He also proved that water may be decomposed by the rheo-electric machine, as with the galvanic current. The two electricities, as developed by this machine, appeared to him to be visibly different: the resinous electricity was subject to remarkable changes of colour, according to the state of the atmosphere and the nature of the exciting body. It also struck him that electricity is radiated in a peculiar manner from magnetized bodies. Combining this observation with a hypothesis respecting the electricity of the globe, viz., that the equatorial parts of the earth are in the resinous (in old language, negative) state of electricity, the poles vitreous (positive); while the atmosphere is, in its lower strata, vitreous, and in the upper resinous; the author proceeded to exhibit the phenomena of the aurora borealis by direct experiment. "I procured a globe

of steel and magnetized it. It may not be unnecessary to state how this was effected. I suspended the globe upon an axis, and by a multiplying wheel and pulley set it in rapid rotation; while rotating I made the magnetizing bars traverse from the equator of the globe to the poles. I then tested it with a proof needle, and found it to be regularly and perfectly magnetized. The next object was to place this magnetic globe in similar electric circumstances to those which I conceived the earth to be in. Regarding that region of the atmosphere immediately over the torrid zone as the principal seat of atmospheric electricity, I conceived, that if I surrounded the globe with a ring that would bear approximately the same proportion to the globe, as this region of the atmosphere does to the earth, and electrized them oppositely, that the action of the electricity of the ring upon the air immediately enveloping the globe, would place the latter in nearly similar electric circumstances to those of the earth. If, then, the aurora were an electric phenomenon, that is, a discharge of free electricity, taking place from the pole of the earth, rendering the vortex, which I supposed to be immediately over the pole, luminous, from the great rarefaction of the air within it, and passing over our atmosphere to the upper stratum of the equatorial region, that as I could increase the electric intensity of my artificial terrella as I pleased, an analogous effect would be produced. This result followed with the greatest precision, as I shall now describe. I insulated the ring, and connected it with the resinous conductor of the rheo-electric machine. I also insulated the globe, and connected one of its poles with the vitreous conductor, and placed it so that its equator was surrounded by the ring. These bodies being electrized differently, and at a very short distance from one another, one would expect that a discharge would have taken place between them; instead of this, they at once re-acted upon one another, so that the exterior of the ring being resinous, the interior became vitreous; the equator of the globe resinous, and both its poles highly vitreous; and a truly beautiful and luminous discharge took place from the unconnected pole. The state of the atmosphere has a remarkable effect upon the appearance of this discharge. One evening that the atmosphere was very dense, it had the appearance of a ring of light, the upper part of which was very brilliant, and the under part, towards the globe, was comparatively dark, just as we see at the bottom of ignited vapour; and indeed a vapour of some kind seemed to be ascending from the globe; above the ring, all round the axis were foliated diverging flames, one behind the other. When the atmosphere is very dry, it has merely the appearance of a beautiful electric brush. If the globe be moved towards any point of the interior of the ring, a discharge takes place in the line of shortest distance between them, and then there is a partial intermission of the auroral light. This experiment seems to point out the true cause of the aurora borealis."

This paper gave rise to a most animated but desultory conversation, in which the President, Dr. Robinson, Dr. Scoresby, Dr. Green, and Mr. Snow Harris took part. In the course of this discussion, several questions were asked tending to elucidate the construction and peculiarities of action of the rheo-electrical machine as well as Mr. Nott's views. Mr. HARRIS then stated that he was about to publish, in the *Nautical Magazine*, the observed facts connected with more than 300 thunder-storms, from which he thought it would amply appear that thunder-storms were connected with, and in some manner caused by, opposing and violent currents of wind. That the wind, after blowing for some time from one quarter, changed, and at this crisis, first a calm, and then a flurry and confusion of the wind, blowing from every point of the compass, ushered in the change. It was in this confused state that the rapid deposition of vapour seemed to take place, torrents of water pouring down, and sometimes hail and even large masses of ice, as in the late thunder-storm at Cambridge, by which, as the Dean of Ely had informed him, that immense destruction of property had taken place, the hail breaking even strong plate-glass.

Prof. LLOYD made a short communication, on the method of Graphical Representaion, as applied to Physical Results. It is well known, that if a series of ordinates be taken to denote the observed values of any physical quantities, the corresponding abscissæ denoting the respective values of the variable upon which it depends, the course of the first variable, at intermediate points, may be represented by drawing a curve through the extremities of the ordinates of observation, the exactness of the representation depending on the shortness of the intervals. The observed values of the ordinates, however, being subject to the errors of observation, it is manifest that their extremities are not necessarily points of the representative curve; and the object of the author was to inquire whether, and under what circumstances, *other* points could be substituted for those of immediate *observation*, the former being connected with the latter by known relations. Such a course is usually resorted to, when the intervals of observation are small, and the errors considerable, the curve being, in such cases, drawn (*not through*, but) *among* the points furnished by observation, allowing a weight in proportion to their number. The validity of this process appears to depend on two principles—viz. 1. That the positive and negative errors are equally probable; and 2. the assumption that the function represented is not subject to abrupt changes. It is obvious, however, that its applicability will depend upon the relation in any particular case, which subsists between the intervals of the successive ordinates and their probable errors; and it is important to know what that relation is. The points connected with those of observation by the simplest relations, are those obtained by bisecting the interval between each successive pair, or taking the arithmetical mean both of the ordinates and abscissæ. It is very easy to express, in this case, the relation sought.

Sir W. HAMILTON inquired whether the curve, so corrected by Prof. Lloyd, would not, by a continuation of the process, gradually approach to a straight line, and at length end by becoming one, as the first and last points were alone left unchanged during the process. Prof. Lloyd replied in the negative; as the number of points was not diminished during the process.

Sir W. HAMILTON 'On a Problem in the Calculus of Differences.'—The author here offered a solution of a curious and important problem, which had exhausted the analytical resources of Laplace, who arrived at an equivalent transformation, but by a much less simple analysis.

SATURDAY.

'On the Correction to be applied for Moisture to the Barometric Formula,' by J. Apjohn, M.D.—If the atmosphere were of one uniform temperature throughout, destitute of moisture, and the intensity of gravity were also constant, it is well known that the difference of the altitudes of any two points in the atmosphere would be represented correctly by the formula $D=m\times\log.\frac{p}{p'}$, m being a constant quantity, and p and p' being the respective pressures at the upper and lower stations, as measured by the barometer, or in any other way. The conditions, however, which lead to this simple expression, are in nature never fulfilled; for it will seldom happen that the temperature of either station is 32°, and the atmosphere always includes a greater or less amount of aqueous vapour. A correction for temperature has been long applied, by augmenting the approximate height, or $m\times\log.\frac{p}{p'}$, by the amount that a column of air of this length would expand, if raised from 32° to $\frac{t+\theta}{2}$, t being the temperature of the lower, and θ that of the upper extremity of the aerial column,—by which the expression becomes $D=m\times\log.\frac{p}{p'}\left(1+\frac{\left(\frac{t+\theta}{2}-32\right)}{493}\right)$. Such is, I believe, a correct account of the present form of the barometric formula; at least, when we neglect the correction for variation of gravity, which is, however, so minute as to be in general safely negligible. The pressure of moisture in the air must obviously exercise some disturbing effect upon this formula; but though this has been generally admitted by those who have turned their attention to the subject, I am not aware that any attempt at estimating its exact amount has been as yet made; and as the correction for moisture is frequently of considerable magnitude, and may, in my opinion, be applied with as much accuracy as that for temperature, I have taken the liberty of occupying for a few moments the time of the Section with an explanation of the method which it has occurred to me to devise, and with which, from some trials I have made of it, I feel every reason to be satisfied. Let p be the pressure, and t the temperature of the air at the lower station, t' the dew point of the air, and f' the force of the included vapour; and let p', θ, θ' and F' represent the corresponding quantities at the upper station. This being understood, a little consideration will suffice to show that the presence of the aqueous vapour produces upon the formula a twofold deranging effect. It augments the values of p and p' beyond what they would be in dry air; and it produces an elongation of the column of air between the two stations, additional to that which results from the excess of its mean temperature over 32°, or the freezing point. The first of these is obviated, or, in other words, the correction for it is made, by substituting for p and p' in the approximate formula, $p-f'$ and $p'-F'$, by which it becomes $D=m\times\log.\frac{p-f'}{p'-F'}$. Having thus eliminated the effects of the tension of aqueous vapour upon the pressures, we have next to estimate the conjoint influence of it and temperature in elongating the pillar of air between the two stations. The theory of mixed gases and vapours enables us to do this, provided we can assign proper mean values to the temperature, the pressure, and the force of vapour of the aerial column in question. The mean temperature is usually taken as $\frac{t+\theta}{2}$; and this must be very nearly its true value. For the same reason the mean force of the vapour may be set down as $\frac{f'+F'}{2}$; and let us assume the mean value belonging to the pressure as $\frac{p+p'}{2}$. Now, volume v, of dry air at 32°, under a pressure p, if raised to a temperature t', becomes $v\times\frac{461+t'}{493}$; and if saturated with vapour at this temperature, the tension of such vapour being f', will become $v\times\frac{461+t'}{493}\times\frac{p}{p-f'}$. This is the volume of the air when raised to t', and saturated at this temperature with vapour. And if this volume of air have its temperature farther raised, we shall say to t, then its bulk will be represented by the expression $v\times\frac{461+t'}{493}\times\frac{p}{p-f'}\times\frac{461+t}{461+t'}=v\times\frac{461+t}{493}\times\frac{p}{p-f'}$ Substituting then in this expression, instead of v, the value of the length of the column of air between the stations supposed dry, and at 32°, viz. $m\times\log.\frac{p-f'}{p'-F'}$ and for p, t, and f', their proper mean values as already explained, the barometric formula finally becomes

$$D=m\times\log.\frac{p-f'}{p'-F'}\times\frac{461\pm\frac{1}{2}(t+\theta)}{493}\times\frac{\frac{1}{2}(p+f'+p'+F')}{\frac{1}{2}(p+f'+p'+F')-\frac{1}{2}(f'+F')}.$$

I may add here, that the correction for moisture is far from being insignificant in its amount, as may be seen by the following example. Let us suppose that, when the approximate height corrected for temperature amounts to 2,700 feet, (a height reached by several of our Irish mountains) the mean value of the pressure to be used in the final factor of the formula, is 27.3, and of the force of vapour, .3 of an inch, then the elongation of the aerial column resulting from moisture, is $\frac{3}{90}=\frac{1}{30}$th of 2,700=30 feet. It will, of course, have been observed, that the correction for aqueous vapour differs from that for temperature in the circumstance of being always positive; and this coincides perfectly with the observation I have had frequent occasion of making, viz., that heights calculated by the formula in general use, are all appreciably less than the truth. I may, in conclusion, observe, that in assuming,—with the view of calculating the expansion produced by moisture,—that the pressure to be employed is the arithmetic mean of the corrected pressures got

by observation at the two stations, I am quite aware that I am assigning to it but an approximate value. An exact expression for the pressure to be employed admits of being investigated; but its introduction into the formula, while it would give this latter complexity of form, and thus render it less suited for practical use, would conduct to results not appreciably different from those given by the more simple method just explained.

The President briefly pointed out the practical importance of this correction, arising from the extensive use now made of the barometer in geodesical operations, and the uncertainties and discrepancies in its results, which had heretofore been so baffling, but which this correction seemed to afford a prospect of removing.—Prof. Lloyd remarked that Laplace was aware of the necessity of some correction being, in general, requisite to be made in the barometric formula, and had increased the co-efficient from .00375 to .004, which, no doubt, would occasionally give an approach to the correct result; but this correction, so ably brought under the notice of the Section by Dr. Apjohn, was the first attempt at a universally applicable correction.—Dr. Apjohn remarked that Laplace's increase of the co-efficient could only give the result correct in one particular hygrometric state of the air, while in every other it must be erroneous.

Mr. Scott Russell then read the concluding Report of a series of observations on the Tides of the Frith of Forth and of the East Coast of Scotland.—These observations extended over several seasons, and no complete report had been hitherto presented, as the observations of each former season had only shown the necessity of further extending the observations. The observations of the first season had proved the existence of certain anomalous tides, which had not formerly been accurately examined, and proved that these anomalies were more extensive than was at first conceived. Next season the observations were more widely extended, so as to comprise the whole phenomenon, including many adjacent places, to which the same anomalies were traced; and thus the general nature and extent of the phenomena were determined with accuracy and precision, and reported to the last Meeting. But it was found that great differences of opinion existed with reference to the cause of these ascertained phenomena, and rendered it obvious that the observations required to be extended still further, in time and extent, in order to settle conclusively the questions which had arisen out of the former inquiries. But this last series, from their extent and completeness, had now been so fully examined and discussed, as to afford ample means of deciding on the nature of the phenomena, and determining their origin. Simultaneous observations had been made at nearly twenty stations on the east of Scotland, from Newcastle and Shields to Inverness, and as many as 2,000 observations a-day registered and discussed. The results of these were exhibited in the tables and diagrams accompanying the Report: and the result of the whole had been to elucidate, in a remarkable manner, the mechanism which propagates along our shores and rivers the great ocean-wave, which carries from one place to another the successive phenomena of the tides—in such a manner as could not have been attained by any system of observation less extensive than that which had been adopted. It is pretty generally known that the phenomena of the tides with reference to their generating cause, the influence of the mass of the sun and of the moon in the various relations of distance and direction of these luminaries, have recently been examined with great success, in a series of researches carried on, first by Mr. Lubbock and then by Mr. Whewell, partly with the co-operation of this society. By means of their labours we are now enabled to predict, with unlooked for accuracy, the time of high water, and the height of the tide in many of the harbours of Great Britain. But many of the local phenomena of tides remained unaccounted for, and these had been the object of a special series of researches, of which the present formed a part; the object being to determine in what way the conformation of the shores, and of the bottom of the sea, and the forms of the channels of rivers and friths, affect the phenomena of the tidal wave. The rivers Dee and Clyde had been formerly examined with this view. To these were now added the Forth, the Tay, and the Tyne, and the northern shores of the German Ocean. The manner in which these observations were conducted, is not the usual one, of noting down simply the hour at which high water occurs, and then the hour of low water, along with the height at which the water stands at these times. Such a method had been found quite inadequate to the purposes for which such observations are required, and, indeed, he thought it of importance that all tide observations should, if possible, be made in the manner he was now about to describe, especially all tide observations made for scientific purposes. This plan was, to carry on simultaneously at the places examined, a series of continuous observations, every five minutes night and day, by successive observers, without intermission, for the period of a month, or of several months, as might be required. Printed forms were sent to all the stations, and in them, the observers simply noted down every five minutes, the height of the tide on a graduated scale placed before him. Every day at noon all these papers were sent by post to the central station, and immediately on their arrival, the papers of the different stations were compared, and their observations laid down on paper, so as to give a graphical representation to the eye of all the observations, by means of which, they were at once verified and compared with great facility. From the examination of these tide-waves thus laid down, certain characters of the tide-wave peculiar to each locality had been discovered. As in the former observations of the Clyde and the Dee, it had been found in this series, that the form and dimensions of a channel produce important changes in the form of the tide-wave. Where the sea was deep and the shore open and abrupt, the form of the tide-wave was symmetrical, and of the form predicted by Laplace, where he says, that in rising and falling, the water covers in equal times equal arcs of a vertical circle. This is the form of the ocean tide-wave; but, on approaching a shallow shore, and travelling along a shelving coast, the tide-wave undergoes two changes—its summit becomes displaced forwards in time, its horizontal chords become dislocated, and the wave ceases to be symmetrical. This peculiar dislocation and displacement are characteristic of a littoral tide, and in the case of running streams, the currents still further affect the tide-wave, and give to it a peculiar distortion characteristic of fluvial tides. To these were further added the exaggeration and elevation of the tide, by means of narrow channels. All these phenomena were fully proved by the present series of observations. The author of this paper also considers it to have been fully established by the observations on the Frith of Forth, that there exists on the eastern coast, satisfactory evidence of the presence of a second tide-wave in that part of the German Ocean, and that the southern tide-wave, a day older than the northern tide-wave, sensibly affects the phenomena of that part of the coast. To this he attributes the double tides of the Frith of Forth, the nature of which he fully explained. Regarding these double tides, various theories had been formed—and there were various ways in which such tides might happen, whenever tide-waves arrive by different paths in different times. But this kind of double tide was, in this case, only to be explained by the method he had adopted, and which removed the difficulties in which the subject had formerly been involved. He then proceeded to explain the mode of discussion which had been adopted. It was the semi-diurnal inequality, so accurately examined by Mr. Whewell, which enabled us to decide on the ages of two tides. If the two tides which appeared together, presented opposite inequalities both in time and in height, regularly alternating, varying with the moon's declination, disappearing with it, and re-appearing with it, and following it regularly, without regard to other simultaneous changes of a different period, then it became plain that no other inference could be drawn, than that which he had mentioned; when, further, he had proceeded to treat these tides as compounded of two successive tides, one due to a transit $12^h\ 24^m$ later than the other, and had used for this purpose two simple river tides super-imposed at a distance in time corresponding to that at which the northern and southern tides could enter the Frith, he had obtained a close representation of the double tides of the Frith of Forth; when these two methods of examination ended in the same conclusion, he conceived that it had obtained a very high degree of probability. By means of these observations tide-tables had been formed, which were designed to afford a more accurate means of predicting the local tides of the east coast of Scotland than any we now possessed.

Dr. Robinson and the President put several questions to Mr. Russell, for the purpose of eliciting the facts more clearly.—Lord Mountcashel inquired whether Mr. Russell had observed and accounted for any of the tidal phenomena which were denominated bores, and described one which he had witnessed in the River Seine, the rapidity of which far outstripped that of the steam-boat in which they were proceeding.—Mr. Russell said that he had frequently observed this phenomenon, and described the bore of the River Dee, and of the Solway Frith. He then briefly accounted for it on the principle of the tidal wave coming with enormous rapidity from deep water, where it was freely propagated into shoal water, where the upper part, retaining its velocity less impaired while the bottom was retarded, it toppled over, at length, breaking in its rapid onward course.—Captain Larcom observed that the Ordnance Survey would contain a very full account of the tidal phenomena along the coast of Ireland. Captain Larcom hoped before long to lay before the Association the result of the observations made on the coast of Ireland in the course of the Ordnance Survey. Gauges were established at different stations, and observations have been made every five minutes during the course of three lunations. The direct object of them was to obtain data for the plane of mean sea level; but while the observations (which are now in course of reduction) are likely to decide this, they also give much valuable information as to irregularities like that just mentioned. He might mention that in Lough Swilly the spring tide high water was eight feet higher than in Lough Foyle.

'Experiments to prove that all Bodies are in some degree Inelastic, and a Proposed Law for estimating the Deficiency,' by E. Hodgkinson, F.R.S.—Mr. Hodgkinson said it was a principle generally acknowledged in the present day, and employed by those who have written on the subject of elasticity, that, when bodies are acted upon by forces tending to elongate or compress them in a small degree, the changes produced are in proportion to those forces; and that equal extensions and compressions are produced by equal forces. That this principle is true, so long as the change produced in bodies is very small, is not be doubted; and as regards *extensions* it is the basis of the early investigations of Jacques Bernouilli on the elastic curve; of Hooke who was its author (Theory of Springs, Phil. Trans., 1666,); Mariotte, Leibnitz (De Resistentia Solidorum, 1684). With respect to elasticity, it was adopted in the profound inquiries of Euler on the strength of columns, which were corroborated by Lagrange (Berlin Memoirs); and with respect both to *extensions* and *compressions*, it forms the basis of the calculations on the strength and elasticity of bodies in the principal theoretical and practical works on mechanics of the present day; as the Mécanique of Poisson, and the works of Whewell, &c.—the practical treatises of Navier, Poncelet, Tredgold, Barlow, Moseley, &c. He hoped, however, to convince the Section that this principle does not operate *alone* in the resistance of bodies subjected to tension, or to compression, or to both. He hoped, too, to show the law which the element, not considered by writers, nor generally known to exist, is subject to. This element is a defect of elasticity, or a set, to which all bodies made to undergo a change of form, however small, seem to be liable. The defect here mentioned was known to exist only when the body had been strained with a considerable force, or such as to be equal to one-third, or upwards, of the breaking weight. But the experiments which he should adduce would show that the defect commences with the smallest changes of form, and is increased according to the square of the extension, or compression, or of the weight. Thus, if e represent the extension or compression which the strained body had undergone, and $a\,e$ the force which would have produced that extension or compression if the body had been perfectly elastic, the real force necessary to produce this change, e, will be less than the former by a quantity, $b\,e^2$, representing the defect of elasticity. Hence the force required to produce a change, e, is $a\,e - b\,e^2$, where a and b are constant quantities. He had found this law to obtain when the change produced in the body arose from extension or com-

pression alone, but when the change arose both from extension and compression, as in the flexure of a rectangular body, the force of a fibre was to that due to perfect elasticity, as $a\,x - b\,x^2$ to $a\,x$; or it was equal to $a\,x - b\,x^2$, where x was the weight applied, and a b constant quantities, as before. In proof of these statements, Mr. Hodgkinson mentioned that having remarked, in his experiments made for the British Association on the subject of hot and cold blast iron, that the elasticity of bars broken transversely was injured much earlier than was generally assumed, he paid particular attention to this circumstance in his future experiments, and had bars so formed that he could separate the elasticity of extension from that of compression; by these bars, which were very long and of small depth, he perceived that one-fiftieth or one-eightieth of the breaking weight was sufficient to injure the elasticity. He mentioned the matter to his friend, Mr. Fairbairn (who was associated with him in the inquiry), soon after he had made the discovery; and Mr. Fairbairn's subsequent experiments made to determine the strength of rectangular bars of iron, from all parts of the kingdom, were conducted in the same manner as Mr. Hodgkinson's had been; the deflexion and quantity of set, or defect of elasticity, from each weight being always observed. Mr. Fairbairn's experiments were on bars cast one inch square and five feet long, and were made with the utmost care; Mr. Hodgkinson has, therefore, adopted their results with respect to the "set," and taking means both from Mr. Fairbairn's results and his own on the same sort of bars, he has sought for the relation between the weights and the mean sets from those weights, these sets being the deflexions or deviations from the original form of the bar, after the weights have been removed. To ascertain the relation above, Mr. Hodgkinson had curves described from the results of the experiments, making the sets the abscisse, and the weights the ordinates; and the similarity in appearance of these curves to the common parabola, led him carefully to examine whether they were not in reality represented by that curve. The examination was successful—the parabola was the curve; and the mean results of the observed sets, together with the calculated ones, from equal additions of weight, from 56 to 448 lb., derived from 44 kinds of cast iron, and from 90 to 100 experiments, were as follows,—

Weights	56	112	168	224	280	336	392	448
Mean sets	.003	.013	.026	.047	.069	.102	.136	.197
Computed sets (parabolic)	.003	.012	.027	.047	.072	.102	.138	.181

Mr. Hodgkinson made experiments on stone, timber and wrought iron, and observed the quantity of set in all. These different materials, when the results from them were constructed, all gave the form of the parabola, though less perfectly than in cast iron, as the experiments on them were but few. It appears, from the above-stated experiments, and others that were made, that the sets produced in bodies, are as the squares of the weights applied. Hence, there is no weight, however small, that will not produce a set and permanent change in a body; all bodies, when bent, have the arrangement of their particles altered to the centre; and when bodies, as the axles of railway carriages, are alternately bent, first one way and then the opposite, at every revolution, we may expect that a total change in the arrangement of their particles will ensue. It appears, too, from the results of these experiments, that all calculations hitherto made, on the strength and elasticity of bodies, have been only approximations. Mr. Hodgkinson stated, that he laid the results of this communication before a meeting of the Literary and Philosophical Society of Manchester a short time ago, soon after he had made the discovery which it contains. In the prosecution of the experiments he had received every assistance which the works of his friend, Mr. Fairbairn, could supply; and Mr. Robert Rawson had kindly assisted him in the reduction and arrangement of the results of the experiments.

This communication gave rise to much conversation, in which the President, Prof. Lloyd, Dr. Robinson, and other persons joined, and in which all agreed, that these experimental inquiries were of the utmost importance in supplying a solid foundation for the speculations of the mathematical investigator in this most difficult branch of physical inquiry. Dr. Robinson also inquired, if Mr. Hodgkinson had observed whether the molecular structure of the bodies, on which he had experimented, was altered in any manner, and if so, how did the change take place, during the progress of the experiments?—Mr. Hodgkinson replied, that he had no means of determining this point satisfactorily, but he had no doubt, that matter, when subjected to strain, long before it broke, had its molecular structure permanently deranged. He exemplified this by the axles of locomotive engines, which, as they turned round, had the parts that were extended and compressed successively underneath and above; and after this action had been continued for a long period, they were found to become of a kind of crystalline structure, internally, and of course were much impaired in strength.—Prof. Stevelly said, that the forces to which they were subjected were in kind, though not in degree, something like the alternate bending back and forward of a piece of wire, under which it at length broke.—Mr. Hodgkinson assented.

Dr. Robinson made the following report to the Section on the progress of the Committee appointed for making experiments with Captive Balloons.

"The requisite apparatus is nearly complete. The balloon, eighteen feet diameter, and twenty-five feet high, has been received at Woolwich by Colonel Sabine. Mr. Wheatstone's Electric Thermometer has been tried, and found to act in the most perfect manner at distances of some miles, and I have ordered the addition of another part for giving the hygrometric indications. A series of experiments has been made on the strength and weight of cordage of various kinds of fibre; the proper quality has been decided on, and I am happy to state, that Mr. Enderby, who has taken great interest in these inquiries, will present the necessary quantity of it to the Association. Unless some unforeseen occurrence interfere, I hope we may be able to have a series of observations for the twenty-four hours on the 21st of September next. Of the original grant of 250*l.*, 81*l.* 8*s.* has been expended. The Directors of the Woolwich Gas-Works have shown every wish to accommodate us, and assisted us in our preliminary experiments, so as to make the inflation of the balloon perfectly manageable. To complete the advantages of our position at Woolwich, I would suggest it as extremely desirable, that a request be made by the Association to the Master-General of the Ordnance, entreating his assistance."

The following paper from Prof. Wheatsone, which ought to have accompanied the preceding Report, was not received by Dr. Robinson till near the close of the meeting.

The telegraph thermometer which is intended to be carried up by the balloon, weighs, with its case, about four pounds. It is thus constructed; the movement of a small clock causes a vertical rack to ascend and descend regularly in six minutes, three minutes being occupied in the ascent and three in the descent. The rack carries a fine platina wire, which moves within the tube of a thermometer; the extent of motion of this wire corresponds with 28° of the thermometric scale, but it is capable of adjustment, so that it may pass over any 28° of the range. Two very fine copper wires, covered with silk, and of sufficient length to reach from the ground to the balloon, when at its greatest elevation, are connected with the instrument in the following manner: the extremity of one wire is connected with the mercury in the bulb of the thermometer, and that of the other wire with the frame of the clock, which is in metallic continuity with the platina wire. On the ground, the lower extremities are joined together; in the wire whose opposite end is connected with the mercury in the thermometer, a sensible galvanometer is interposed, and in the course of the other wire a single, very small, voltaic element is introduced. The galvanometer having been properly adjusted to its zero point, it will remain so during the time that the platina wire is not in contact with the mercury in the tube, but the needle will deviate so soon as the contact takes place, and will remain deflected until contact is again broken during the ascent of the rack. During each half second of time, corresponding with the beats of the clock, the wire moves through the 360th part of its range, and a different point of the range consequently corresponds with a different beat, or half second of each alternate three minutes. If, therefore, an observer below be furnished with a chronometer, timed to coincide with the clock in the balloon above, and note at what instant the needle of the galvanometer is deflected, he may infer from that observation the temperature indicated by the thermometer in the balloon; for, according to the different expansion of the mercury in the thermometer, the contact is broken at a different half-second. Should the rates of the two time-pieces not exactly correspond at the conclusion of a series of observations, the results will not be vitiated, as a correction may be easily made. It is intended to add to this apparatus a wet-bulb thermometer; this will involve only the addition of another platina wire to the rack, and of another insulated wire, reaching from the balloon to the earth, with its interposed galvanometer.

For other meteorological instruments, the indications of which are to be transmitted to a distance, I occasionally employ the agency of electro-magnetism to ring a bell, to mark with a type, or pencil, &c.; but for the purpose in question, such methods cannot be so conveniently employed as the deflexion of the needle of a galvanometer, on account of the necessity of having the long conducting wire extremely fine, in order to avoid adding too much to the weight of the balloon. If the electromotive force of the rheomotor were increased, which it would be necessary to do were stronger currents required, sparks would occur at the surface of contact of the mercury, which would produce injurious effects.

Major Beamish asked, to what height Dr. Robinson supposed these balloons would allow the observations to extend.—Dr. Robinson replied, probably 1,000 yards, which would be amply sufficient, if the observations were obtained throughout that range with a sufficient degree of precision.

Dr. Robinson communicated a Catalogue of Mean Places of 50 Telescopic Stars, within two degrees North Polar distance, observed at Markrea Castle, county of Sligo, by E. J. Cooper, Esq.

Sir David Brewster made the following provisional reports:—

1. 'Meteorological Observations at Inverness.'—These observations were begun on the 1st of November, 1842, and will be completed on the 1st of November, 1843. The observations with Osler's anemometer commence and terminate at the same date. The accompanying letter, from Mr. Gray contains farther details on the subject. It is to be hoped that the Association will authorize the continuation of the hourly observations, &c. for another year.

2. 'Meteorological Hourly Observations at Unst.'—These observations, which are not yet reduced, commence on the 16th of May, 1841, and terminate on the 16th of May, 1842. By some inexplicable accident, the observations with the *external thermometer* were omitted, or rather the thermometrical observations were made within the apartment. The observations, which are very interesting and valuable in other respects, were under the superintendence of Dr. Edmonstone, of Bath Town. From the circumstance already mentioned, it will be necessary to have another year's observations made at this station.

3. 'On the Action of different Bodies on the Spectrum.'—These observations have been carried on since last meeting of the Association, and the properties of various rare substances have been examined. Owing to the great want of sunshine in the locality of St. Andrew's this year, my observations on the direct solar spectrum have been comparatively few. In a short communication to the Physical Section, I shall have occasion to mention a few of the results obtained during other investigations. The pecuniary grant of the Association has not been exhausted, and it would be desirable to continue the balance as a new grant.

Section B.—CHEMISTRY AND MINERALOGY.

'On the Influence of Light on a great variety of Metallic and other Compounds,' by Mr. R. Hunt.—The author, having briefly detailed the numerous discoveries in this branch of inquiry from the time of the alchemists to the present day, proceeded to describe the results of his experiments, made with nearly every variety of chemical combination. It was not in the view of establishing any theory relative to the solar agency that this matter was brought before the Section, but merely to put upon record a great number of facts, which appear to prove the constant acting of the sun's rays upon all bodies, and to show the boundless extent of this inquiry. It has been shown, by

Petit, that light influences the arrangements of crystals. Labillardière and Michellotti have shown the necessity of light to the developement of pores in plants, and its injurious influence on young plants and animals. The experiments of Ritter, and others, down to the time of Niepce and Daguerre, have shown many peculiarities in the action of this agent. But since that period the list has been wonderfully increased by the researches of Wollaston, of Davy, of Fox Talbot, and, above all, by the extraordinary discoveries of Sir John Herschel. We are now acquainted with combinations of silver, of gold, of mercury, and of iron with many non-metallic bodies, which are speedily changed under the sun's influence, and which are sufficiently sensitive to be used as photographic agents. The author has been successful in adding platinum to the list of photographic agents; which metal gives considerable promise of utility in the art. He has also been successful in producing photographic images on the salts of manganese, of tin, of antimony, of lead, of cobalt, and of arsenic. He has produced pictures with chlorine, iodine, and chromine vapours received upon the surfaces of a great variety of metals, and even on wood and on leather; and many of the alkaline and earthy salts have given evidence of this extraordinary property of the sun's rays. The author contended, that from the extensive series of results which he had obtained, he was fully warranted in expressing it as his opinion that all bodies were constantly, under the influence of the solar emanations, undergoing a change of state; that, indeed, photographic images were always formed, on whatever body a shadow fell: we were only ignorant of the immediate agency by which these images could be called forth; but we were rapidly arriving at the knowledge we desired.

Many of the photographic specimens on the table were remarkable for the extreme fidelity with which the images were delineated, and the variety of tints they had assumed.

'On Cerium, Lanthanium, Didymium, Terbium, and Erbium,' by Prof. Mosander, of Stockholm, translated by Major L. Beamish, F.R.S.—This important communication contained a technically minute account of the author's experiments (some of which have been published in scientific periodicals,) on cerium, in the course of which he detected two new oxides which he has named lanthanium and didymium. In like manner, his close examination of yttria led him to discover, in combination with it, two oxides, to which he has given the names terbium and erbium.

Dr. TAMNAU, of Berlin, exhibited some rare mineralogical specimens.—1. A group of Datholith, from the neighbourhood of Andreasberg, in the Hartz. 2. Two specimens of rose-coloured Harmotome, from Andreasberg. The colour in these specimens was attributed to the presence of a small quantity of cobalt. They were remarkable for the great size of their crystals, which exhibited not only the usual twins, but also curious and complicated arrangements of three and four, combined according to laws not yet sufficiently understood to allow of their being clearly described. 3. Two very large isolated crystals of Beryl, from Royalstone, Massachusetts. These were of a beautiful sea-green colour, one of them of the usual form, a regular six-sided prism, with the direct terminal face. The other exhibited the faces of the second six-sided prism, of a twelve-sided prism, and of a twelve-sided irregular pyramid. The last of those forms is here observed for the first time.

'On the Production and Prevention of Smoke,' by Mr. Henry Dircks.—Mr. Dircks thought it important to distinguish between open fires, and close fires or furnaces. Open fires would always allow an escape of absolute coal gas, and admit atmospheric air to the chimney; whereas the contrary would be the result with the close fires of engine-boiler furnaces. He said that the leading fact of consequence, in reference to the smoke, was, that it differed materially from the impure gas evolved from the coal in the furnace. The plans hitherto adopted by manufacturers were chiefly intended to burn *smoke*, and the great principle of all such plans was to burn the largest quantity of fuel with the least quantity of air. The error of this method must appear to every one conversant with chemistry. Smoke may be considered as mere carbonaceous matter floating in an atmosphere of the ordinary incombustible products of combustion; the admission of air to this smoke is of no value, as it will only cool it, and make it more readily deposit its sooty particles. The impure gas of the coal, on the contrary, may be inflamed by a due admixture of air. In conclusion, Mr. Dircks begged to state as a general principle, that on the large scale of the furnace, air should be supplied to the impure gaseous products of the fuel by a source independent of that supplying air by the ash-pit to the solid fuel.

Prof. APJOHN inquired whether Mr. Dircks spoke of Mr. Williams's plan of admitting air to furnaces, and on his replying in the affirmative, he said that he had read Mr. Williams's Treatise on the 'Combustion of Coal,' which gave a correct view of the chemistry of the subject, and, indeed, seemed to have almost exhausted it.—Mr. WEST made some remarks on smoke consuming.—Mr. Dircks, in reply, said that he agreed with Mr. West in the possibility of burning smoke, agreeably to popular phraseology, but he did not think it possible in a scientific sense.—The CHAIRMAN explained that Mr. Dircks was correct in his statement, as to the propriety of supplying the air before the gaseous products assumed the state of smoke, at which period only it was available for the proper chemical prevention of smoke.

FRIDAY.

SECTION C.—GEOLOGY AND PHYSICAL GEOGRAPHY.

'On the Lower Portion of the Carboniferous Limestone Series of Ireland,' by R. Griffith, Esq.—This elaborate communication was accompanied by numerous large coloured sections, which illustrated the author's minute descriptions of particular localities. The carboniferous rocks, as subdivided by Mr. Griffith, are in descending order as follows:—1. *The upper limestone* forms the base of the millstone grit series; it averages 600 feet in thickness, and is very fossilliferous in its upper part. 2. *The Calp series* consists of a succession of dark gray slates alternating with dark impure limestone; beds of yellowish sandstone occupy the middle of the series, which is usually 1000, and occasionally 1800 feet thick. The shales of this division contain numerous fossils, especially Posidoniæ, of which there are six species. 3. *The lower limestone* occupies a very considerable portion of the surface of Ireland, and contains a great abundance of fossils; its average thickness is about 1000 feet. The carboniferous slate and yellow sandstone were formerly considered as part of the old red or Devonian system, but from the affinity of their fossils to those of the carboniferous deposits, Mr. Griffith has been induced to include them in the latter system. 4. *The carboniferous slate* contains 274 species of fossils, of which 262 are common to the upper limestone, and 65 are found in the Devonian deposits. 5. *The yellow sandstone* is most fully developed in the northern districts of Ireland, and sections of it are seen on the north coast of Donegal Bay, the northern shore of Lower Lough Erne, and in the counties of Fermanagh, Mayo, and Londonderry. On the north coast of Mayo it rests on beds of the old red sandstone, and attain a thickness of 1460 feet. At Lough Erne the mica slate is covered, unconformably, with 50 feet of red conglomerate, succeeded by yellow sandstone, shale, &c. 150 feet thick, containing calamites and the *Modiola McAdami*. This series of shale and sandstone is continued upwards, through a space of 2900 feet, to the base of the lower limestone: it is impossible at this locality to draw the line of separation between the yellow sandstone and carboniferous slate, but the latter probably includes about 1200 feet of the whole mass. At several other localities the yellow sandstone also rests unconformably upon red conglomerate, apparently belonging to a distinct epoch. The most remarkable and extensive district of yellow sandstone in Ireland occupies the whole of the northern and eastern shores of Lough Foyle, in the county of Londonderry; its lower beds are a conglomerate, formed from the mica slate on which it rests; they are 600 feet thick, and not fossilliferous. The second division of the rocks in this district, which is 500 feet in thickness, contains numerous beds of dark shale and grayish sandstone; and the uppermost consists of red, greenish, and yellowish shales, with numerous thin bands of nodular limestone and red sandstone, passing into quartzose conglomerate, resembling the ordinary old red sandstone. These strata are succeeded by beds of gray shale, white sandstone, and dark gray shale, which in this locality forms the uppermost portion of the series. In the second of these divisions the fossils are numerous, including seven species of Cythere and the *Modiola McAdami*, together with the remains of fish belonging to the genera Gyracanthus, Ptychacanthus, Leptacanthus, and Holoptychius. In the third division, which is about 1400 feet thick, fossils occur only in the conglomerate limestone; they consist of several species of Orthis, Spirifer, &c. This deposit differs in some respects from the usual appearance of the yellow sandstone and carboniferous shales, but from the evidence of the fossils Mr. Griffith is induced to refer it to that deposit. The last important locality described by the author is the carboniferous valley of Ballinamore, in the county of Leitrim, between the old slate range of the Cairnclonhugh mountains of Longford and the millstone grit district of Slieve anecrin, in the county of Leitrim. In this valley the slate rocks are succeeded, unconformably, by sandstone conglomerates, impure arenaceous limestone, and dark gray shale with thin beds of sandstone, altogether about 70 feet in thickness. These are succeeded by 150 feet of yellowish quartzose sandstone, and 100 feet of limestone, dark shale, and calcareous sandstone, above which the carboniferous slate, lower limestone, calp shale, and upper limestone occur in regular succession up to the millstone grit of the Slieve anecrin mountains. In the lowest calcareous strata of this locality were discovered numerous species of Cythere, the *Modiola McAdami*, the *Oracanthus Milleri*, and other ichthyolites, and several plants. The limestone above the shale also contained numerous plants, and abundance of *Orthis crenistria*, &c. in its upper beds. The carboniferous slate and other beds contained the Fenestellæ and other usual fossils in abundance. At Cultra, on the southern shore of Belfast Lough, are a series of strata formerly considered by the author as a part of the new red sandstone and magnesian limestone group, but from an examination of the fossils last year, he has ascertained that they are coeval with the deposits of the valley of Ballynascreen. The beds consist of red sandstone, and contain casts of four species of Cucullæa, *Pullastra antiqua*, several Nuculæ, and a Cypricardia. The shales overlying these beds contain in abundance the scales of *Holoptychius Portlockii*, together with fifteen species of Cythere, *Modiola McAdami*, *Orthoceras regulare*, *Cypricardia socialis*, and five species of Cucullæa. In the southern portion of this section, commencing on the shore of Strangford Lough, the limestone of Castle Espie is shown, also resting unconformably on the old slate. It contains *Actinoceras Simmsii*, *Producta gigantea* and *latissima*, *Orthis cylindrica*, *Spirifer imbricata* and *glabristria*, and *Cyathophyllum fungites*. The limestone is succeeded by various coloured sandstones, extending northward to Scrabo Hill and the old slate ridge of the Ards peninsula. From a review of all these sections, and a careful comparison of the lists of fossils obtained from them, Mr. Griffith has been induced to class these deposits with the lowest members of the carboniferous series.

Mr. MURCHISON pointed out the connexion between the "Cambrian slates" of the counties Down and Armagh with the Silurian rocks of the Mull of Galloway and the Lammermuir hills, containing graptolites and other fossils. He suggested that as some of the beds coloured as old red sandstone by Mr. Griffith contained upper Silurian fossils, they might belong to that series; whilst the upper beds of the same rock appeared, from Mr. Griffith's paper, rather to belong to the carboniferous series, and probably represented some of the beds seen on the banks of the Tweed.—Mr. PHILLIPS stated that although the carboniferous series of Ireland was extremely well developed, yet no classification could be derived from it without a comparison between it and its equivalents in other countries, and he believed the classification already proposed for England would be found equally applicable to Ireland. The yellow sandstone was also found in Pembrokeshire, covered by several hundred feet of carboniferous shales with organic remains, forming the equivalent of the carboniferous slate of Ireland; the limestone, shales, and millstone grit, still higher up, contained the same organic remains, and represented the upper part of Mr. Griffith's series. The old red sandstone had

been considered by Mr. Conybeare as a part of the carboniferous series, and in countries where it was not well developed, this classification might have sufficed; but in Pembrokeshire the old red sandstone was 3500 feet thick, and proceeding eastward, in Herefordshire, it was augmented to 4000 feet; whilst in the borders of the Forest of Dean, the whole series, of conglomerates, cornstones, and sandstones, from the Silurian rocks at their base to the mountain limestone above, formed a series 7000 feet in thickness. Such a mass must have required a great lapse of time for its formation, especially as its component beds were due to many distinct mechanical and chemical forces. During this interval beds were forming in Devonshire, the Eifel, and Russia, containing groups of shells and fishes sufficiently characteristic in themselves to constitute a distinct system.—Mr. LYELL observed that the yellow sandstone of Ireland closely resembled the beds of passage between the old red sandstone and the carboniferous strata in Scotland; he also remarked upon the similarity of the Irish carboniferous deposits to the coal-fields of North America, the number of fossil plants identical in each deposit proved the similarity of the laws which regulated the distribution of organic life, and also the great uniformity of climate during that distant epoch in England and America, the principal features remaining the same amidst all the local variations.

SATURDAY.

'Notice of the Ordnance Geological Museum,' by J. Phillips, Esq., F.R.S.—The Ordnance Museum has for its object two purposes, both bearing on geological science. The first of these is to procure, during the progress of the Ordnance Geological Survey, now under the direction of Sir Henry De la Beche, an accurate delineation of the boundaries of all the strata; not laid down conjecturally, but from actual observation and exact measurement. For this purpose there is attached to the Trigonometrical Survey a staff of active geologists, who walk over the boundary lines and draw sections, in which every part is measured and laid down on a scale true to nature. The practice of making the vertical scale of sections greater than the horizontal had led to much mischief and many mistakes, especially in mining operations, and in working for coal. The second object of the Museum was to form a collection of the fossils of every stratum in every possible locality, with the view to ascertain the law of geographical distribution of species, and their geological distribution in successive strata. It was usual for geologists to collect only fine and beautiful specimens; but this system would never enable them to trace the exact areas of distribution of organic life in former epochs. In connexion with this system of collecting organic remains, a method of drawing them had been proposed: each species, as soon as sufficient information could be procured, was to be drawn by good artists, with magnified views of minute structure; and these were to be engraved on steel, a separate plate being given to each species, and published at so low a price as to place them within the reach of all persons interested in the science. Mr. Phillips invited collectors of fossils to give their aid in forwarding this work, by lending specimens of rare or new fossils, and announced that in such cases electrotype impressions would (if approved) be taken of them, so as to supply museums and collectors with correct representations of unique or valuable fossils. In conclusion, Mr. Phillips stated that the Ordnance Museum would be eventually opened to the public as freely as any institution of the same nature.

Mr. GRIFFITH stated, that in the progress of the Ordnance Survey of Ireland he had obtained 950 species of fossils in the carboniferous series alone, 200 of which were new or undescribed. All these had been, or would be, engraved and published at his own expense; but the Silurian fossils, which he had also collected, should be forwarded to the Museum in London, to be published by the Director of the Ordnance Survey.

'Report on the Excavation made at the Junction of the Lower New Red Sandstone with the Coal Measures at Collyhurst, near Manchester,' by E. W. Binney, Esq.—The rocks of the new red sandstone series, in the vicinity of Manchester, are described by Mr. Binney as occupying hollows previously formed by great dislocations in the carboniferous strata. Along the valley of the Irk the upper new red sandstone, the magnesian limestone, and the lower new red are exposed in succession; but as the absolute point of contact between the coal measures and lower new red sandstone had not been seen, a deep cutting was made at a place called Tinker's Brow, about one mile N.E. of the Manchester Exchange. The different beds were thus described by Mr. Binney in descending order. 1. *The till*, locally known as *marl* and *brick clay*, containing blocks of granite, sienite, porphyry, greenstone, basalt, and various other igneous rocks; clay slate, Silurian rocks, mountain limestone, chert, millstone grit, ironstone, &c., from the coal series, magnesian limestone, and the waterstone of the upper new red. These fragments are of various sizes, the largest being five tons in weight, and are mingled together without any order of deposition: near the edge of the great fault they are larger and more numerous than in any other part of the till near Manchester. Those boulders, such as the granites, porphyries, and hard slate rocks, which do not occur *in situ* within 100 miles of Manchester, are mostly well rounded, and some are scored with striæ and polished; whilst those found in the neighbourhood, such as mountain limestone, &c., are less striated and polished, and many are quite angular. Although the boulders occur in the clay, without any distinct lines of deposition, there occurs at one point a deposit of fine laminated silt and sand, ten or twelve inches thick, and about a yard from the bottom of the till, which is twenty-one feet in thickness, and rests on an uneven surface of lower new red sandstone, evidently waterworn; in some places holes two or three feet deep being found occupied by the till. 2. Lower new red sandstone; composed of dark red sand, variegated by patches of a yellowish-drab colour; its thickness is full forty yards; the main dip is to the S.W., at an angle of 16° to 18°, but it has also a considerable inclination to the N.W. No fossil remains have been found in it. 3. *The Coal Measures;* consisting of a bed of salmon-coloured argillaceous shale, thirty feet thick, containing impressions of *Neuropteris cordata*, and many common coal plants. The coal measures were partly elevated before the deposition of the new red sandstone formation, but it is evident that the latter have been raised by forces which have subsequently elevated the coal measures, as the similarity of dip in both strata testifies.

Mr. HOPKINS observed that the occurrence of a bed of silt, evidently deposited by a current of water, in a deposit so ambiguous as the till, would probably remove the difficulty of accounting for its origin; since, to whatever cause one part was attributed, the other must also be referred. He did not consider the angularity of certain fragments in the till an objection to their having been transported; at the same time remarking the difficulty of separating the causes of effects, where the efficiency of each of those causes could not be doubted.—Mr. LYELL reminded the Section that those geologists who attributed the occurrence of boulders in the till to the agency of floating ice, always assumed the action of currents in the distribution of the material in which they were imbedded.—Mr. PHILLIPS remarked the similarity in the circumstances and phenomena presented by the till of Collyhurst with the deposit at Holderness, described in his 'Geology of Yorkshire.'

'On certain Movements in the Parts of Stratified Rocks,' by J. Phillips, Esq., F.R.S.—Mr. PHILLIPS stated that for many years the attention of geologists had been called in a very essential degree to the internal structure of rocks; but notwithstanding the advances made by Prof. Sedgwick and Mr. Hopkins, there were points still remaining to be investigated, before mathematicians could explain the forces by which these phenomena had been produced; because any such explanation must be based upon data afforded by the actual constitution of the rocks themselves. Twenty years since, he had observed such remarkable symmetry in the crystalline forms of prismatic masses of slate in Westmoreland, that he had measured their planes, and satisfied himself that they were not of the nature of ordinary crystallization, and that the term, crystalline structure, as usually applied to them, was by no means legitimate. In order to understand the nature of the mechanical forces which have produced the cleavage, it is important to study it in its relation to every form of strata. Where the contortions do not affect the cleavage planes, it is evident that they were first formed; the joints and fissures which interrupt the cleavage but do not disarrange it, were probably posterior, like many of the faults which interrupt the strata and cut off the cleavage. When layers of concretionary ironstone occur in slaty rocks, the cleavage planes are arrested and "troubled" in their passage through them, from which it appears that the nodules had become solid previously to the strata being divided by the planes of cleavage. Several attempts had been made to imitate cleavage structure. Mr. Fox, of Cornwall, had caused electric currents to pass through moistened clay, and had thus produced fissures parallel to the bounding surfaces of the mass, and this illustration Mr. Phillips considered very important, but incomplete. The cleavage planes of the slate-rocks of Wales were, he stated, always parallel to the main direction of the great anticlinal axes, but were not affected by the small undulations and contortions of those lines. In North Wales they maintained the same direction for fifty miles, not varying more than two or three degrees, which might be owing to local causes, such as the movement of masses by gravity at a period subsequent to the formation of the cleavage. In making observations upon the cleavage of rocks, care must be exercised not to confound with those phenomena the marks produced by the mechanical movement of one rock upon another. The shells in slaty rocks were generally distinctly marked by ferruginous lines, caused by their decomposition, and the form of their outlines was often remarkably changed. The Leptænæ in North Devon occasionally assumed the form of nuculæ, and the Spirifers were crumpled up, or else extremely attenuated. The Trilobites of the Llandeilo flags were found in three distinct forms, arising from the distortion taking place in a longitudinal, transverse, or oblique direction; this seemed to be the result of a "creeping" movement of the particles of the rock along the planes of cleavage, the effect of which was to roll them forward, in a direction always uniform, over the same tract of country; the movement does not seem to have affected the hard shells, but those which were thin, as also the algæ and trilobites: the latter are covered with little folds, parallel to the wave of motion. In these distorted fossils the amount of movement might be estimated; as, in the space occupied by a trilobite, it amounts to half an inch. Mr. Phillips had selected these facts, bearing the aspect of real and general laws of structure in rocks, from a series of classed phenomena on the subject, because he regarded them as positive steps towards a mechanical theory of the series of changes by which the structural characters and accidents of position were to be determined.

Mr. HOPKINS remarked that Mr. Sedgwick had been the first to ascertain the true relation of the slaty structure of rocks to their original bedding. The phenomena of *cleavage*, he thought, could only be accounted for by internal forces; and it was extremely difficult to estimate the effects of the molecular action of one part of a rock upon another, and required a more accurate mathematical analysis than we now possess.—Mr. Phillips, in reply to a question from Mr. Lyell, stated that he had collected sufficient data to determine the limits of the period during which the phenomena of cleavage had been produced in South Wales. All the great anticlinals in South Wales, and he believed also in the South of Ireland, had affected alike the Silurian rocks, the old red sandstone, and carboniferous slates, the shales above and below the mountain limestone, and all the coal strata. The magnesian limestone rests in such a manner as to indicate that these movements had taken place previously to its deposition. The cleavage must therefore have taken place subsequently to the newest coal strata, but without affecting more modern formations. Mr. Phillips then alluded to phenomena resulting from the action of heat, which, although quite of another nature, might still bear on the question. Near Newcastle a whin dyke, twenty-four feet in thickness, cuts through shales containing plants which mark the plane of stratification, to the distance of ten feet from the dyke; these lines of bedding are entirely obliterated, and in their place a series of perpendicular fissures are produced, parallel to the dyke. —Mr. BINNEY observed that the coal shales, when subjected to the intense heat of a furnace, often exhibited vertical lines of cleavage, breaking them up into

hexagonal prisms. The coal itself presented, usually, three directions of cleavage—one parallel to the lines of bedding, one at right angles to it, and the third in a diagonal direction. He mentioned a Sigillaria, one foot in diameter, which had been found upright in the Pennant coal. The bark of this plant was converted into bituminous coal, with vertical cleavage, whilst that of the interior had the rhomboidal character. Mr. Binney also announced (as we mentioned last week) the discovery of an *upright tree*, nine feet high, in the coal strata at St. Helen's, near Liverpool.

'On the "Permian System" as applied to Germany, with Collateral Observations on Synchronous Deposits in other Countries; showing that the Rothe-todte-liegende, Kupfer Schiefer, Zechstein, and the lower portion of the Bunter-sandstein form one natural group, constituting the upper member of the Palæozoic Rocks,' by R. I. Murchison, Esq.—The word *Permian*, when first proposed by Mr. Murchison, was intended to distinguish a natural group of deposits, lying between the well-known carboniferous strata beneath and the less perfectly defined trias above it. The author at first suggested that the group (so designated from the ancient kingdom of Permia, which is exclusively occupied by it,) should combine those deposits known under the name of Rothe-todte-liegende (lower new red of England), Kupfer Schiefer, Zechstein, &c. (magnesian limestone, &c.) Subsequently, however, he was disposed to doubt whether it might not be more correct to class the Rothe-todte-liegende with the coal-bearing deposits beneath it, than with the Zechstein, because the plants of the lower red sandstone could not be distinguished from those of the coal measures. Revisiting Hesse, Saxony, Silesia, the Thuringerwald, and other parts of Germany, Mr. Murchison has obtained what he considers proof that the Rothe-todte-liegende is part and parcel of the same natural group as the Zechstein, and must therefore be considered part of the Permian system. He has also convinced himself that the great deposit hitherto known under the denomination of Bunter-sandstein, Grès bigarré, or new red sandstone, should be divided into two parts, the lower of which ought to be classed with the Permian, and separated from the trias, with which it had been merged. To prove the first of these positions, or that the Rothe-todte-liegende is a part of the Permian group, Mr. Murchison cited the order of succession in numerous sections in Germany, showing an uninterrupted sequence from the lower red conglomerate sandstone and shale into the overlying Zechstein. It is a question whether the plants of these lower red rocks can be distinguished, as a whole, from those of the subjacent coal measures, plants being, as yet, the only organic remains found in them. From his observations in Saxony, and particularly from an inspection of the fossil plants collected and partly described by Captain Gutbier, Mr. Murchison believes, that such a separation exists. Among the coal plants of Saxony are forms of Neuropteris closely approaching to, if not identical with, those species which occur in the Permian rocks, whilst there is no trace of the common plants of the under-lying coal. These plants being imbedded in a whitish or cream-coloured finely levigated clay-stone, and their leaves being brought into beautiful relief by being invariably as green as if they had peculiarly and happily dried in an herbarium, form admirable subjects for the most precise distinctions of the fossil botanist. In Silesia (at Ruppendorf, and other localities west of Waldenberg, between Breslau and Glatz) there is a fine developement of strata from the base of the Rothe-todte-liegende (where that deposit overlies a productive coal-field based upon true mountain limestone) into other red sandstones and shales, which have a marked aspect, from being interlaced with bands of black, bituminous, thin, flaggy limestone. Though doubts had been entertained as to the age of this limestone, Mr. Murchison does not hesitate to consider it as the equivalent of the Zechstein, and the whole red group of which it forms a member as the counterpart of the Permian system; for, besides its very clear position, this calcareous flagstone contains plants and fishes similar to those of the Permian rocks of Russia. Among the former the *Neuropteris conferta, nov. spec.*, of Göppert, has been identified with the most common fern brought from Russia. The most abundant fish is the *Palæoniscus Wratislaviensis*, Ag. On this occasion Mr. Murchison passed rapidly over the zoological proofs that the Zechstein and Kupfer Schiefer of Germany are the equivalents of the calcareous beds of the Permian system of Russia, as these had been given in detail in memoirs read before the Geological Society. He stated, however, that his opinion was now perfectly in harmony with that of Prof. Phillips; namely, that the Fauna of the Zechstein, or magnesian limestone, has so much of the same general zoological type as the carboniferous limestone, that it must also form a part of the palæozoic series. Mr. Murchison then proceeded to consider the age of these lower beds of the Bunter-sandstein, which had been hitherto included in the trias, on lithological evidence only. They contain no fossils, either in Hesse, Saxony, or Thuringerwald, where the Zechstein and Kupfer Schiefer are most developed; and from all Mr. Murchison's inquiries and observations, it appears that the upper mass only of the Bunter-sandstein contains the remains of animals and plants analogous to those of the Muschelkalk which rests upon it. The footmarks of the Cheriotherium appeared also to be confined to the beds of sandstone, at a very little depth below the Muschelkalk. From these circumstances Mr. Murchison was induced to regard the upper beds alone of the Bunter-sandstein as belonging to the trias, whilst the lower portion, which, though generally unfossilliferous, contained in Russia the same groups of fossils with the Permian rocks, he proposed henceforth to separate from the secondary system, and consider it, together with the Zechstein and Rothe-todte-liegende, as the upper member of the palæozoic series, supposed to be represented by a thin band of dolomite. The plants of the Permian system of Russia appear, from the opinion of M. Adolphe Brongniart, to possess a peculiar character; but they are still closely allied to carboniferous forms, like the plants of the Rothe-todte-liegende of Saxony; and this evidence is in complete harmony with that afforded by the molluscs, corals, and ichthyolites. In conclusion, Mr. Murchison remarked that the English strata ranging under the synonym of Permian, formed a well-defined tract, separating the coal-fields from the newer deposits of red sandstone and marl; and as the magnesian limestone does not often appear in the form of a continuous deposit, it was the more desirable to give a certain latitude to this group, and not to define it too narrowly by mere mineral characters. Thus considered, Mr. Murchison believed the Permian system had a real existence in Ireland, being represented by those beds containing the *Productus aculeatus*, and probably also by the red sandstone with the *Palæoniscus catopterus*, at Rhoan Hill, near Dungannon.

Mr. GRIFFITH said, that the red sandstone of Rhoan Hill belonged to the lowest part of the new red series in Ireland.—Mr. PHILLIPS stated that the dolomitic conglomerate of Bristol rested unconformably on the mountain limestone, and no further evidence of its relation to the magnesian limestone had been obtained by the Ordnance Survey besides the Saurian remains originally discovered by Dr. Riley and Mr. Stutchbury.—Mr. LYELL remarked that the similarity of the sedimentary deposits produced by rivers in different parts of the world, at the present day, afforded confirmation of the identity of distant deposits, having similar mineral characters, and the same place in the series. He considered the occurrence of remains of Thecodont Saurians in the Bristol conglomerate a strong proof that it belonged to the same age with the Zechstein of Germany, containing a Saurian presenting the same peculiarities of structure; namely, the dentition of the crocodile, combined with the vertebræ, sternum, and extremities of the lizards. He also referred to the discovery of the tracks of a reptile, associated with a series of corals and shells, low down in the carboniferous series of Nova Scotia, the rocks in which they occurred being covered by a vast series of deposits containing a large series of plants, nearly every one of which was identical with species found in the English coal measures. —Mr. BINNEY stated that foot-marks of the Cheirotheria had lately been found in the middle of the Bunter-sandstein of Cheshire, together with three fish belonging to the genera Cœlacanthus, Platysomus, and Palæoniscus, scarcely distinguishable from coal measure species.

Mr. HOPKINS explained his views respecting the cause of the Motion of Glaciers.—De Saussure had adopted the theory which attributes this motion to the resolved part of gravity acting along the inclined surfaces on which all glaciers in motion are situate; and he explained, also, how the motion would be facilitated by the effects of the internal heat of the earth, and of subglacial currents. When the attention of philosophers, however, was recalled a few years ago to this subject, and more accurate observations and admeasurements were made, the inclinations of the beds of glaciers were found, in many cases, to be so small (in the glacier of the Aar, for example, not exceeding three degrees), that it appeared extremely difficult to conceive how the force of gravity alone could be adequate to overcome the friction on the bottom and sides of the glacier, and the numerous local obstacles to its movement. Numerous experiments on the descent of bodies along inclined planes had shown, that when the surfaces of the bodies and planes were perfectly hard and polished, no motion would ensue without an inclination considerably greater than that of many glaciers; and, moreover, that the inclination required to produce motion was independent of the weight of the sliding body. These considerations led to the very general rejection of De Saussure's theory, and to the adoption, by many persons, of the *dilation theory*, of which M. Agassiz had been the principal advocate. According to this theory a part of the water produced by the dissolution of the superficial portion of the glacier during summer passed, by infiltration, into the minute pores and crevices of the glacier, where it was again converted into ice, and by its expansion in the process of freezing produced a *dilation* and consequent motion of the glacier. It was manifest, however, that the frequent alternation of freezing and thawing within the glacier which this theory assumed, could not possibly take place at depths beneath its surface exceeding a very few feet, and therefore could not produce any sensible effect on the motion of the whole mass. This theory presented many other difficulties, of which no adequate solution had been given; and the author could not but consider it as contrary to the most obvious mechanical and physical principles. Another theory had also been put forward, which attributed the motion of glaciers to the expansion of water in the act of freezing, after it had filled, not the minute pores of the ice, but internal cavities of considerable dimensions. But, since the temperature of the glacier at considerable depths must be sensibly constant, how were new cavities to be formed when existing ones had been once filled up? The author, regarding both this theory and the preceding one as untenable, was thus led to examine how far the apparent objections to De Saussure's theory were really valid, by a series of experiments on the descent of ice down inclined planes. The experiments were made in the following manner: a slab of sandstone, prepared to be laid down as a part of a common flagstone pavement, was so arranged as to be easily placed at any proposed inclination to the horizon. The surface of the slab, so far from being polished, retained the grooved marks of the instrument with which the quarry-man had shaped it. A quantity of ice was placed on the slab, within a frame nearly a foot square, intended merely to keep the ice together, and not touching the slab, with which the ice alone was in contact. The following were results obtained in one set of experiments, the ice being loaded with a weight of about 150lb.:—

Inclination of the planes	3°	6°	9°	12°	15°
	inches				
Mean space for one hour	0.31	.62	.96	2.	2.5

When the weight was increased, the rate of motion was also increased. The least inclination at which sensible motion would take place, was not determined; but it was ascertained that it could not exceed *half a degree* in the case of a smooth but unpolished surface. With a *polished* surface of a marble slab, the motion of the ice indicated a deviation from horizontality with as much sensibility as water itself. It will be observed, in the results above given, that (1) the motion was unaccelerated; and (2) it increased with the inclination, and (when the inclination was not greater than nine or ten degrees) in nearly the same ratio; and (3) the rate of movement was of the same order of magnitude as in actual glacial motion, which may be stated generally, in cases yet observed, never to exceed two feet a day. The extremely small friction between the plane and the ice, indicated by the small inclination necessary to produce motion, was manifestly due to the circum-

stance of the lower surface of the ice being in a state of gradual disintegration, which, however, was extremely slow, as proved by the small quantity of water proceeding from it. In the application, therefore, of these results to the case of actual glaciers, it was necessary to show that the temperature of their lower surfaces could not generally be less than 32° Fahr. Such, the author stated, must necessarily be the case, unless the conductive power of ice was greater than it was deemed possible that it could be. He considered the sub-glacial currents as powerful agents in the disintegration of the lower surfaces of glaciers, especially near their lower extremities. The results of Prof. Forbes's observations on the motion of the Mer de Glace of Mont Blanc, afforded, as regards that glacier (and, by inference, as regards all other glaciers) a complete refutation of the theories which attribute glacial movements to any expansion or dilation of the ice. The Professor had, however, put forth a new theory, which agreed with that offered by Mr. Hopkins in attributing glacial motion to the action of gravity, but differed from it entirely as a mechanical theory, in other respects. The Professor appeared to reject the sliding theory of De Saussure, on account of the difficulties already mentioned (which were now removed by the above experiments), and assigned to the mass of a glacier the property of *plasticity*, or *semifluidity*, in a degree sufficient to account for the fact of its descending down surfaces of such small inclination. According to this theory, the motion was due to the small cohesion of one particle of glacial ice to another. Mr. Hopkins stated his conviction that the internal cohesion of the mass was immensely greater than its cohesion to the surface on which it rests, whenever the lower surface is in a state of disintegration. It was perfectly consistent with this conclusion to assign to the glacier whatever degree of *plasticity* might be necessary to account for the relative motions of its central and longitudinal portions under the enormous pressure to which, according to his theory, he showed it might be subjected. Such relative motions, however, were probably facilitated more by the *dislocation* than the plasticity of the mass. Sufficient, he trusted, had been advanced to prove that the *sliding theory* assigned a cause adequate to the production of all the observed phenomena of glacial movements. With respect to the transport of erratic blocks and detritus from the Alps to the Jura, Mr. Hopkins observed that the greatest height which glaciers had formerly attained in the valley of the Rhone (whence a large portion of the erratics had been derived), appeared to be well defined by lateral moraines and polished rocks, while the greatest height at which these blocks had been deposited on the Jura was also well defined. Thus, according to M. Charpentier, the Rhone glacier must have risen, at the mouth of the valley, to about 2,500 feet above the existing surface of the Lake of Geneva; while the highest band of detritus on the Jura was stated to rise to a still higher level. It was inconceivable, therefore, that such detritus should have been lodged at its present elevation by former glaciers. The only way in which it appeared possible to obviate the mechanical difficulties of the subject, was to suppose the transport to have been effected when the Jura was at a lower level relatively to the Alps, and the whole district lower relatively to the surface of the ocean. In such case, the space between the Alps and the Jura may have been occupied by the sea, and the ice, with its transported materials, may have passed from the former to the latter chain, partly with the character of a glacier, and partly with that of an iceberg. This hypothesis is perfectly consistent with the supposition of the general configuration of the surface of the Jura having been the same at the epoch of the transport as at the present time; and Mr. Hopkins believed it would be found equally so with all the observed phenomena of that region.

Col. Sabine related, in illustration of the agency of glaciers in transporting rocks, that when the Antarctic Expedition had reached 79° S. lat., the vessels were stopped by a barrier of ice, from 100 to 180 feet in height, and 300 miles in extent from east to west; beyond these cliffs of ice they discovered a range of lofty mountains, 60 miles from the sea, the westernmost of which appeared to be 12,000 feet in height. From the face of these ice-cliffs vast masses were constantly breaking off and floating northward, bearing with them fragments of the rocks which they had derived from the mountains. In the latitude of 66° and 67°, a distance of 700 miles from the glacier, these floating icebergs appeared to be usually arrested so as to form a floating barrier, at which ships were often stopped; and it had been observed, that between this zone and the cliffs, the sea deepened considerably. Over all this area the icebergs would be constantly strewing masses of rock and detritus, particularly at their northern limit, where they would probably form mounds resembling terminal glacial moraines. Colonel Sabine then described similar phenomena in Baffin's Bay, which he stated to be, in most parts, deeper than the thousand-fathom line, but shallow at the strait which forms its entrance. The bay was surrounded by alternate cliffs of rock and valleys occupied by glaciers, and presenting cliffs of ice along the shore, from which masses became detached and floated off to the zone of shallow water at the entrance of the bay, where they were constantly becoming arrested in their progress, and deposited the fragments of granite, trap, and limestone containing fossils, derived from the shore.

'Report of the Committee on Earthquakes in Scotland.'—The Committee state, that from the end of June, 1842, to the 1st of July in the present year, thirty very slight shocks of earthquakes have occurred at Comrie, in Perthshire, and have been registered by Mr. M'Farlane, who has the charge of the instruments belonging to the Association. The last autumn he stated to have been particularly dry, and the barometer seems to have been unusually low at the time of the shocks. The first shock took place on the 24th of Sept., 1842: the inverted pendulum in the steeple of Comrie Church was moved one-eighth of an inch to the S.E., and the common pendulum to the same distance eastward. The instruments were slightly affected on two other occasions. Earthquake shocks were also felt on the 19th of August, 1842, at Pitlochey, near Dunkeld, and on the 25th of Feb. and 3rd of March, 1843, at Oban and Lochgilphead, in Argyleshire. Shocks were also stated to have been noticed in North Wales, on the 22nd of August, 1842, and near Manchester, on the 10th and 17th of March, 1843. The nature of all these shocks is recorded as very similar to those described in last year's Report.

Section F.—STATISTICS.

Sir W. Chatterton presided, in the absence of Sir Charles Lemon.

Mr. Bianconi was called on to read a paper promised by him on a former day. The following was then read, which, on account of its personal and national interest, we give verbatim:—Up to the year 1815, the public accommodation for the conveyance of passengers in Ireland, was confined to a few mail and day coaches on the great lines of road. From my peculiar position in the country, I had ample opportunities of reflecting on many things, and nothing struck me more forcibly than the great vacuum that existed in travelling accommodation between the different orders of society. The inconvenience felt for the want of a more extended means of intercourse, particularly from the interior of the country to the different market towns, gave great advantage to a few at the expense of the many, and above all, occasioned a great loss of time; for instance, a farmer living twenty or thirty miles from his market town, spent the day in riding to it, a second day doing his business, and a third day returning. In July, 1815, I started a car for the conveyance of passengers from Clonmel to Cahir, which I subsequently extended to Tipperary and Limerick. At the end of the same year I started similar cars from Clonmel to Cashel and Thurles, and from Clonmel to Carrick and Waterford; and I have since extended this establishment so as to include the most isolated localities, namely, from Longford to Ballina and Bellmullet, which is 201 miles north-west of Dublin; from Athlone to Galway and Clifden, 183 miles due west of Dublin; from Limerick to Tralee and Cahirciveen, 233 miles south-west of Dublin; and numbering 110 vehicles, including mail coaches and different sized cars, capable of carrying from 4 to 20 passengers each, and travelling 8 to 9 miles per hour, at an average fare of one penny farthing per mile for each passenger, and performing daily 3800 miles, passing through more than 140 stations for the change of horses; consuming 3 to 4000 tons of hay, and from 30 to 40,000 barrels of oats annually; all of which are purchased in their respective localities. These vehicles do not travel on Sundays, unless such portions of them as are in connexion with the post office or canals, for the following reasons: first, the Irish being a religious people will not travel on business on Sundays; and secondly, experience teaches me that I can work a horse eight miles per day for six days in the week, much better than I can six miles for seven days. The advantages derived by the country from this establishment are almost incalculable; for instance, the farmer who formerly rode and spent three days in making his market, can now do so in one, for a few shillings, thereby saving two clear days, and the expense and use of his horse. The example of this institution has been generally followed, and cars innumerable leave the interior for the principal towns in the south of Ireland, which bring parties to and from markets at an enormous saving of time, and in many instances cheaper than they could walk it. This establishment has now been in existence twenty-eight years, travelling with its mails at all hours of the day and night, and never met any interruption in the performance of its arduous duties. Much surprise has often been expressed at the high order of men connected with it, and at its popularity; but parties thus expressing themselves forget to look at Irish society with sufficient grasp. For my part, I cannot better compare it than to a man emerging into convalescence from a serious attack of malignant fever, and requiring generous and nutritive diet in place of medical treatment. Thus I act with my drivers, who are taken from the lowest grade of the establishment, and who are progressively advanced according to their respective merits, as opportunity offers, and who know that nothing can deprive them of this reward, and a superannuated allowance of their full wages in old age and under accident, unless their wilful and improper conduct; and as to its popularity, I never yet attempted to do an act of generosity or common justice, publicly or privately, that I was not repaid tenfold. In conclusion, Mr. Bianconi regretted that the shortness of the notice which he had received to meet the Association, should have rendered it impossible for him to prepare a document more ample in details and more worthy of the Section.

Dr. W. C. Taylor read a paper 'On the Pauper Lunatics of Ireland,' the materials of which he stated to have been supplied by the Earl of Devon. Before the year 1817, a few cells in gaols and houses of industry were the only accommodation provided for lunatics; but in various parts of Ireland, and more especially in Kerry, certain secluded glens, called madmen's glens, were, by the tacit consent of the peasantry, set apart for the use of idiots and the insane. In 1817 district lunatic asylums were formed, and placed under the superintendence of government officers. A table was exhibited of the districts for which these hospitals were established, the population of these districts, the number of patients admitted from the contributory counties; but as these give insufficient accommodation, cells for the insane are connected with several of the old houses of industry, where proper medical treatment of the insane, however, is utterly impossible. The author strongly condemned the system of confining lunatics in houses of industry, or, which is still worse, in gaols. By an act passed in the first session of the present reign, power is given to two justices of the peace, acting under the advice of a physician, to commit to gaol, or confine in a lunatic asylum, any one thought to be in a state of mind threatening mischief. It would seem that this statute has operated more widely than could have been anticipated by its framers. From the Sixteenth Report of the Inspectors General of Prisons, it appears, that so recently as the year 1837, there were but 37 insane patients confined in the gaols of Ireland. But in 1840 the number of lunatics confined in the gaols of Ireland had increased to 110; and within the last two years the number has doubled, there being now 240 lunatics and idiots in the gaols of Ireland. There are also 471 idiots and lunatics at present confined in 69 workhouses.

Mr. Dowden read a brief essay 'On the Effect of Light as a part of Vital Statistics.' It stated rather the means by which inquiries on this subject could be conducted, than the results which have been obtained.

FRIDAY.

SECTION G.—MECHANICAL SCIENCE.

Mr. J. HAWKINS described a practice which has lately been adopted in some parts of the United States, of procuring oil and spermaceti from pigs. The pigs are driven into the woods to feed, and after some months they are brought back and fattened with Indian corn. The animals are then killed and boiled altogether, for the purpose of extracting all the lard, which is then converted into *stearine* and *elain*. The oil thus procured is of a remarkably fine quality, and well adapted for lubricating machinery.

Mr. BOOTH described an apparatus for raising miners and minerals from the deep vertical shafts of mines. It consists of a revolving inclined plane, or endless screw-shaft. The threads of the screw are made to act on the peripheries of small wheels extending from the carriage in which the miners, &c. are placed. A rotary motion is communicated to the shaft, and the carriage is raised or lowered according to the direction in which the screw is turned.

Mr. RUSSELL resumed his paper, 'On the Construction of Public Buildings with reference to Sound.'—In the former part of the paper he had shown the method by which spectators and auditors could be arranged in a given room in such a manner that all could see and hear equally well (see *Athen. ante*, p. 780). He next entered into a scientific analysis of the nature and causes of the evils which are experienced in public buildings of a large size and of the usual forms—in so far as these may be deduced from the received laws of sound. These he classed as follows: 1st, Evils arising from reflexion of sounds. 2. Evils arising from spontaneous oscillation, and the independent key-note of the building. In considering this branch of the subject, an explanation was attempted of the fact, that buildings have a key-note and pitch; and a rule for finding that pitch, practically and theoretically, was adduced. 3. Evils arising from interferences of sound, owing to the disproportions and forms of buildings. These evils were all to be remedied by the adoption of the form given in the paper; and, on that construction, he had satisfied himself, that five, ten, or even twelve thousand people might be so arranged as to hear a single voice easily and comfortably. The second part of the paper examined certain phenomena in sound, with which we had not formerly been acquainted. Our knowledge of the laws of sound rested hitherto on an hypothesis, that the phenomena of sound in the air were analogous to the phenomena of water, when disturbed by dropping a stone on the surface of a smooth lake. In this case it is well known, that the water propagates waves round the point of disturbance in all directions, and that these diffuse themselves in concentric rings over the whole surface. In like manner it was taken for granted, that the sound waves, produced by a sonorous body, are of a similar nature, and the laws of sound had been deduced from this hypothesis. These laws were, however, imperfect and erroneous. Sound did not resemble these waves; therefore analogies deduced from such waves were erroneous. These waves of water are denominated by Mr. Russell, waves of the second order. But there is another kind of wave, the wave of the first order, to which the sound wave bears a remarkable analogy. This wave had been examined in another Committee (in Section A), and the properties of this order of wave enable us to solve many difficulties in the phenomena of sound. The common water-waves of the surface of a smooth lake had this property, that they were transmitted with *various velocities*, according to the circumstances producing the wave; but this was not so in the case of the sound wave, the French Academicians having successfully established, that the velocities of sounds of different intensity and pitch are all transmitted in a fluid in a given condition, with precisely equal velocities; now the chief peculiarity of the sound wave is this *constant of velocity*, independent of the conditions of the impelling cause. Another circumstance, serving to identify the sound wave with the wave of the first order, is the similar characters of the formulæ expressing this velocity. Whereas, the formula expressing the velocity of common water-waves is of a form essentially different. It has further been observed, that there exist in the sound wave, and in the wave of the first order, in water, the same *polarity*, the same law of *diffusion*, the same phenomenon of non-reflexion, at certain angles, and the phenomenon of lateral accumulation. From these data the author went on to give new explanations of the theory of whispering galleries, echoes, the conveyance of sound to great distances across lakes, ice, and other smooth surfaces. He applied the principles thus adduced to the explanation of many evils of certain forms of building not hitherto understood, and proceeded to develope the rules and methods to be adopted for the remedies of those evils.

Sir T. DEANE admitted the errors of architects in regard to the transmission of sound. They, however, were not in general free agents; but had to work with materials and according to instructions, which rendered it difficult for them to adopt the best mode of construction for transmitting sound. He had visited eighteen of the court houses in England with a view to correct the defects in the courts at Cork, but in each of these the very same defects exist. At Liverpool they had effected a remedy by reversing the usual order, and placing the judge in the centre of the semicircular court.

Mr. J. TAYLOR described an immense steam-engine, which is now constructing in Cornwall, for the purpose of draining the lake of Haarlem. The cylinder of this "mammoth" engine is twelve feet in diameter, with a twelve-feet stroke. Round this immense cylinder are arranged eleven pumps, each of them of sixty-three inches diameter, with a nine-feet stroke. The valve at the bottom of the cylinder is on the butterfly construction, which is not generally conceived to be well adapted for large engines.

Mr. E. HODGKINSON, in giving a report of experiments carried on at the request of the British Association, concerning the imperfect Elasticity of Solid Bodies, and the practical results to be deduced from them, entered at some length into a consideration of the consequences of a property of elastic bodies, which he had recently discovered. It appeared, from experiments made by him for the Association some years ago, that the elasticity of bodies is injured by much smaller forces than was generally supposed; and by comparing the results of experiments subsequently made, it was evident, that all changes of form, in rigid bodies, by forces however small, effect a permanent *set* on them, showing that their elasticity is, in some degree, impaired. This continued deteriorating action, Mr. Hodgkinson observed, must have great effect on the power of bodies to resist forces, and ought to be taken into consideration in the calculations on the strength of beams, &c. especially when the materials were subject to vibration or concussion. Mr. Hodgkinson did not enter at much length into the theoretical part of the question, as he intended to make a communication on that branch of the subject to Section A.—(see *ante*, p. 798).

Mr. J. SCOTT RUSSELL observed, that at the last meeting they had nothing but a mass of confusion and a collection of new facts on the subject of the strength of materials, but they had now obtained the law by which all those apparently isolated facts were governed. He considered that time was an important element in the destruction of the elasticity of bodies, and stated, in confirmation of this opinion, that in the course of some experiments he was making, it was necessary to stretch a long wire at one half its tension; but in the course of a week it invariably broke, and he was obliged to substitute a new wire. The internal structure of the wire was found to be changed, and it broke on the least bending. He had observed somewhat similar changes in the elasticity of metals from the effects of heat. Cast and malleable iron and brass, he had found, did not return to their former dimensions when expanded by heat; thus a diminution of strength was continually going on in metallic bodies, independently of the ordinary decay from atmospheric action.—Mr. HODGKINSON said, the French writers on the subject had made the strength of cast-iron double what it ought to be, owing to their having taken the old standards for their guide.—Mr. PERRY thought the effect of time in destroying the strength of bodies was a subject deserving more consideration.—Mr. Hodgkinson said, he and Mr. Fairbairn had long since given attention to that part of the question. They possessed bars of iron which had been for years with heavy weights resting upon them. The deflexion was gradually, though very slowly, increasing; and no doubt the bars would ultimately break, but many years would probably elapse before that took place. The bars which had been most loaded came to a fixed condition in about fifteen months.

GENERAL COMMITTEE.

TUESDAY.

The Committee assembled at three o'clock; in the absence of the Earl of Rosse the chair was taken by the Rev. Dr. Robinson.

The following Recommendations, involving Grants of Money, were adopted.

Mathematical and Physical Science.

Brewster, Sir D.—For continuing hourly Meteorological Observations at Kingussie and Inverness ..	£ 12
Harris, W. S.—For completing the Meteorological Observations at Plymouth	35
Robinson, Dr.—For conducting experiments with Captive Balloons	100
Herschel, Sir J.—For Magnetic and Meteorological co-operation	50
Brewster, Sir D.—For investigating the Action of different Bodies on the Spectrum	10
Sabine, Col.—For superintending the Translation and Publication of Scientific Memoirs	20
Baily, Francis, Esq.—For the Publication of the British Association Catalogue of Stars	650
Brisbane, Sir Thomas—For completing the Observations on Tides of the East Coast of Scotland ..	100
Wheatstone, Professor.—For Experiments on Subterraneous Temperature	50
	£1007

Kew Observatory.

For maintaining the establishment in Kew Observatory	200

Chemical Science.

Kane, Professor—For investigating the Chemical History of Colouring Substances	10
Kane, Professor—For inquiries into the Chemical History of Tannin	10
Fox, R. W. Esq.—For continuing Researches on the Influence of Light on Plants	10
	£ 30

Geological Science.

Oldham, —— Esq.—For experiments on Subterraneous Temperature in Ireland	10
Northampton, Marquis of—For making Coloured Drawings of Railroad Cuttings	100
Owen, Professor—For investigation of Fossil Fishes of the Lower Tertiary Strata	100
Whewell, Rev. W.—For completing Level Marks in Somerset and Devon	20
Milne, David, Esq.—For establishing Standard Level Marks on the Coast of Scotland, with particular reference to the direction of shocks of Earthquakes ..	20
	£250

Geology and Zoology.

Carpenter, Dr.—For researches into the Microscopic Structure of Fossil and recent Shells	20

Botany and Zoology.

Strickland, H. E. Esq.—For experiments on the Vitality of Seeds	15
Jardine, Sir W. Bart.—For researches on Exotic Anopleura	25
Portlock, Capt.—For a Report on the Marine Zoology of Corfu	10
Daubeny, Dr.—For investigating the Preservation of Animal and Vegetable Substances	10
Owen, Professor—For researches on the Marine Zoology of Cornwall and Devon, by Mr. Peach, and especially the preservation of Radiata and Mollusca	10
Forbes, Professor E.—For researches on the Geographical Distribution of Marine Animals	25
Hodgkin, Dr.—For inquiries into the varieties of the Human Race	15
	£110

Medical Science.

Sharpey, Dr.—For Inquiries into Asphyxia	10

Mechanical Science.

Russell, J. S. Esq.—For completing the discussion of experiments on the Form of Ships	100
Hodgkinson, Eaton, Esq.—For experiments on the Strength of Materials, and on the changes which take place in their internal structure	100
Fairbairn, W. Esq.—For experimental investigations on changes in the internal constitution of Metals, arising from vibration and concussion	50
	£250

Total of Grants	£1077

Recommendations not involving pecuniary Grants.

Section A.

That Sir J. Herschel and Mr. Baily be requested to continue their revision of the nomenclature of Stars.

That the Master-General of the Ordnance be requested to facilitate the experiments on Captive Balloons, undertaken at the expense of the British Association.

That Prof. Bache be requested to proceed with his report on American Meteorology.

That Dr. Lamont's report of the German Meteorological Association, though not yet arrived, be printed in the volume of Transactions.

That the following Reports be requested for the next meeting.

Prof. Airy, on the progress of Astronomy since his former report.—Prof. Wheatstone, on Vision.—Mr. Hodgkinson, on the Resistance of the Atmosphere to moving bodies.—Mr. Kelland, on the Undulations of fluid and elastic bodies.—

Mr. Talbot, on Photography.—Mr. Phillips on the colour and structure of Clouds.—Prof. Lloyd, a second report on Physical Optics.

Section B.

That the future title of this Section shall be Chemistry and Mineralogy, with their application to Agriculture and the Arts.

That the papers on Cerium and Lanthanium, by Prof. Mosander, of Stockholm, translated by Major Beamish, be printed at full length in the Transactions.

Section D.

That the Government be requested to give some pecuniary aid for the publication of Prof. Forbes's Researches in the Ægean.

That Dr. Richardson report on our knowledge of Fish in the Chinese seas.

That Mr. Blackwall be requested to complete his account of the Palpi.

That Messrs. Alder and Hancock do report on the Nudibranchiate Mollusca.

Section E.

That Mr. Blake continue his researches into the Physiological Action of Medicine.

Section G.

That Government be requested to have Contour Lines of Elevation added to the maps of the Ordnance Survey.

That Messrs. Fairbairn, Hodgkinson, and Buck continue their researches into the Consumption of Fuel and Smoke.

That a Committee be appointed to examine the report on the Forms of Ships, with a view to its publication.

General Recommendations.

That thanks be voted to the Lord Lieutenant for presenting the Association with a copy of the general Census of Ireland.

That the officers and council of the Association shall join in an application from the citizens of Cork to her Majesty's Government, for restoring the Royal Cork Institution to its former efficiency.

The last recommendation unexpectedly gave rise to a very unpleasant discussion, but it was finally checked by the decision of the chairman, and the motion was carried.

To CORRESPONDENTS.—The *first* Report of the Commissioners of the Fine Arts, with the Appendix, was given last year (Nos. 773. 4). The *second* Report merely records progress, as announced from time to time in this Journal. Mr. Barry's Report to the Commissioners, which accompanies it, and to which we presume our Correspondent refers, was published in this Journal in April last, and will be found *ante*, p. 417.

Errata.—In Mr. Hosking's letter, p. 771, col. 1, 22 lines from bottom, for "compared," read confused.—In Messrs. Brain and Payne's advertisement, p. 762, the price of the vols. of the Conversations Lexikon should have been 6*s*.

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Entry	Policy No.	Age	Sum	Annual Premium.	Bonus added.	Cash Bonus.	Premium reduced.
			£	£ *s. d.*	£ *s. d.*	£ *s. d.*	£ *s. d.*
1837	39	50	1000	67 8 4	132 14 6	58 19 9	8 19 4
1838	114	56	3000	175 15 0	296 0 7	123 0 6	16 9 7

Policies now entered upon entitled to participation in next Annual Division. Two-thirds of all premiums paid can be borrowed by the assured without loss of Policy.

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The next Periodical Investigation takes place on 1st January, 1846.

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Annual Premium to Assure £100.

Age.	For One Year.	For Seven Years.	Whole Term.
30	£0 17 8	£0 19 1	£1 11 10
30	1 1 8	1 2 7	2 0 7
40	1 5 0	1 6 9	2 14 10
50	1 14 1	1 19 10	4 0 11
60	3 2 4	3 17 0	6 0 10

One-third of whole-term Premiums may remain unpaid at 5 per cent. comp. int. as a debt upon the Policy for life, or may be paid off at any time without notice.

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FOUR-FIFTHS, or 80 PER CENT. of the total profits, are divided among the Assured at intervals of five years; and all Policies on which two payments have been made, participate in the division.

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